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PERCIVAL SHELDON RIDSDALE, Editor

LIBERTY CAP AND YOSEMITE FALLS, IN YOSEMITE NATIONAL PARK, CALIFORNIA

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"HALL OF FAME" FOR TREES

THE DUMONT KENNEDY ELM

FOLLOWING the printing of the picture of the "Wye Mills Oak" in Maryland as the first picture in a "Hall of Fame" for trees, many pictures and much data have been submitted to the American Forestry Association. Have you a famous tree in your town? The Association wants trees with a history rather than trees of unusual size. The elm pictured here has been watched by Mayor Dumont Kennedy, of Crawfordsville, Indiana, for sixty years. This tree has a spread of 99 feet and is 78 feet high. The tree is more than 125 years old, according to Mr. Kennedy. It is four feet one inch in diameter four feet above the ground. It is not as large as the famous sycamore at Worthington, Indiana, which, for a long time, has been considered the largest shade tree in the country. As to the value of tree planting by the younger generations, Mr. Kennedy gives quite a sermon in one of his letters. This follows:

"I had 12 trees planted on May 10, 1902. I placed them in a circle on a slightly rising mound and set them so as to leave a center at least 100 feet across. This will make a fine place for a house some day, and everybody who sees it, exclaims, 'What a fine building place.' I think these 12 trees have added at least $1,000 to this acre lot. Before I set them it was a bare cow lot, worth about $200. I have talked trees all my life, tried to get all the school boys and others to buy a small tract of ground and begin while young to set trees and improve, but it is difficult to get a boy to understand that he will ever be a man and that he ought to prepare for old age while he has the strength and ambition. A boy thinks it will take so long for a tree to grow, but he never thinks that the time will go anyway, even if he does not set a tree."

It is just this point exactly that the American Forestry Association is placing before every school in the land.

AMERICAN FORESTRY

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THE FOREST POLICY OF FRANCE

THE CONTROL OF SAND DUNES AND MOUNTAIN TORRENTS*

BY W. B. GREELEY

FORMERLY LIEUTENANT-COLONEL, 20TH ENGINEERS, A. E. F.

TWO facts stand out in the physical history of France which offer valuable lessons to the United States. The first is the solidarity between the mountain and the plain—the direct effect upon the lowlands of upsetting the normal balance of soil and vegetation in the uplands. The second is the value of the forest in stopping the movements of soil and water which have wrought havoc, in varying degrees, in practically every country on the earth. These lessons have been brought home to the French with force in the valleys watered by the Alps and the Pyrenees, and their long battles with torrential floods in the one instance, and with invading sand dunes in the other, have influenced profoundly their public forest policy.

The receding waters of the Bay of Biscay left a vast level stretch of sand and marsh in southwestern France known as the "Landes." Toward the sea, these barrens terminate in a belt of dunes from 6 to 10 miles in width. The dunes have doubtless moved inland at various periods, but appear to have been relatively stable during the Middle Ages. In the Seventeenth and Eighteenth Centuries, a new and menacing invasion of the interior took place, which French geologists attribute, in part at least, to the upsetting of the equilibrium of things by human action. The vegetative cover which had formed on the dunes themselves appears to have been broken up by the heavy grazing of the Gascon herds. At the same time, the increasing population in the Pyrenees, supported largely by pastoral industries, led to the progressive denudation of their steep mountain slopes, filling the rivers with detritus and swelling the dune-forming materials available to the tides and winds. At all events, the dunes on the coast of Gascony became dangerously active, many of them moving inland from 30 to 90 feet a year and burying farms and villages in their path.

IN THE FRENCH ALPS

All this section is denuded but efforts to prevent further washing away of the soil are being made by the erection of a large number of gully dams, some of which can be seen in the foreground.

Various attempts to check this invasion were made during the Eighteenth Century; but Bremontier, an Engineer of "Ponts et Chausses," is credited with having developed the methods which were successful in halting the destructive course of the dunes. Bremontier's scheme, which was worked out about 1784, comprised three steps:

(1) The construction of a rampart along the coast, a sort of sea-wall against incoming waves of sand. This was done usually by piling quantities of brush upon the last dune which was forming on the beach and building up this brush revetment, layer by layer, as fast as it filled with sand, until the sand could no longer break over the top.

(2) Planting hardy herbs on the dunes within the rampart until their surface became stable.

*Material for this article has been taken largely from "Cours de Droit Forestier" by Charles Gugot, and from data prepared by G. Garbe, Engineer des Ponts et Chausses.

(3) Planting seeds or seedlings of maritime pine, a fast-growing pitch pine native to the region, in this protecting cover of herbs.

Striking success in the use of this method led, in 1810, to the adoption of a national policy for the fixation of the Gascon dunes. There were delays and difficulties in developing an effective administrative procedure, stoppages due to the political overturns at Paris; and the inevitable conflicts with private property rights. The forestation of the 250,000 acres of dunes bordering the Landes was practically completed, however, by 1864; and the work since that date has consisted largely in the care of the plantations established, the construction of new ramparts along the coast where dangerous dunes were forming, the extension of the successive zones of vegetation up to the limits of security thus established, and the administration of the maritime pine forests which have been created.

The dune belt presented a complex tangle of ownerships—state, communal and private. The method of conducting the work of forestation which was finally evolved bears points of similarity to the plan adopted by some of our states, like Massachusetts, for the planting of private lands. It suggests a modus operandi for state or federal projects in America where the reforestation of private land is required in the public interest. Its principle is not the purchase or condemnation of private property, but the *expropriation of its tenure,* or occupancy, for a sufficient period to establish forests with provision for ultimately restoring the land to its owner when the cost of the enterprise has been met.

Each project was drafted by a local engineer (the work being conducted largely by the Service des Ponts et Chausses), with a map of all holdings involved, a detailed plan of work, and an estimate of cost to each owner. The project having been formally approved, each owner was given the choice of doing the work himself under state supervision, or of placing his land under the custody and control of the state which then proceeded with the reforestation measures at its own cost Once the forest was established, the owner could acquire possession of his land by reimbursing the state for its actual outlay with interest at the legal rate (4 or 5 per cent). Otherwise, the state retained possession until the proceeds from the forest had recouped its expenditures in planting and administration, when restoration to the owner was required by law. As a matter of fact, this process was suprisingly rapid, owing to the low cost of planting maritime pine, its rapid growth in the humid climate of the Landes, and its early yields of turpentine and timber. The state could also divide plantations on private land, restoring a portion to the owner and obtaining full title to the balance in liquidation of its account.

Of the original 250,000 acres of Gascon dunes, the French Government still administers about 150,000 acres. Most of this area has become a permanent state forest, forming a protective belt along the coast, which is managed with special precautions to prevent a possible outbreak of the old peril. The requirements of the "regime forestier," however, are applicable to forests of all classes within the perimeter of a dune fixation project in order that no excessive cutting may undo the great public benefit which has been accomplished.

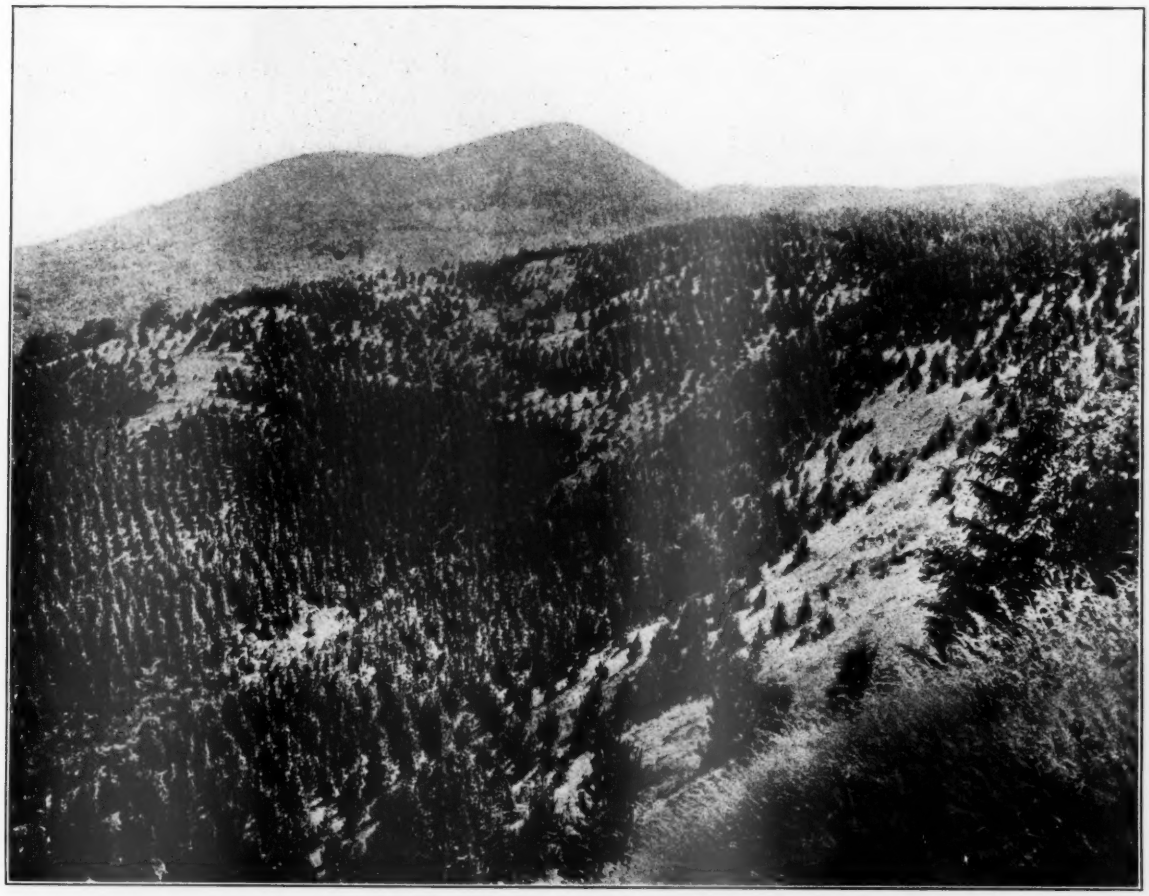
The stabilization of the southwestern dunes in itself was a magnificent achievement in conservation, but it proved to be the beginning of still greater national benefits. Inland from the dunes stretches 2,000,000 acres of almost barren sand and marsh with a few patches of natural pine forest. In the Eighteenth Century, this region was thinly populated, had almost no industries except grazing, and was notoriously unhealthy because of its swamps. The successful reforestation in the dunes gave great impetus to the planting of maritime pine throughout the entire Landes, partly by transplanting wild or cultivated seedlings, partly by sowing pine seed in plowed furrows. During the Nineteenth Century, a least 1,500,000 acres of private land were converted into pine forests as the result of the demonstration furnished by the public work in and adjoining the dunes. The feasibility and profitableness of pine planting were so clearly established that a law was passed in 1857 prescribing the forestation of barren lands in this region owned by the Communes. This law was based upon the same principle as that applied in the fixation of the dunes. Project estimates were prepared by state officers and the Communes given the option of planting their holdings or turning them over to the Government for this purpose. It is noteworthy that in all cases the Communes chose to do the work themselves. Some 185,000 acres of Communal forests were created under this law.

The Landes today are a vast pinery, interspersed with little meadows and neat farms and traversed by a network of surfaced highways. With the spread of the forests and the simple drainage system which forms a part of forest culture, swamps and malaria have disappeared together. There is probably more grazing than ever before, utilizing the dense growth of herbage under the older stands of pine. The fertility of the farm lands has been steadily built up by mulching with litter and bracken from the woods, this being, on many areas, a crop harvested from forest lands almost as regularly as their timber or naval stores. Turpentine orcharding begins when the trees are 25 to 30 years old and is continued on a carefully regulated scale for at least 30 years, when the trees are bled heavily for 4 or 5 years before cutting. The population is several times that of the Eighteenth Century, and three-fourths of it is supported by forest industries.

These old barrens have been transformed into one of the most productive regions of France—a region which furnishes practically all of her naval stores and a large part of her general construction lumber, and exports quantities of pit props to the coal mines of Great Britain. It was one of the principal sources of timber supply for the Allied Armies. American forest engineers laid their logging tracks among the very dunes which were menacing wastes a hundred years ago, but which in 1917 fur-

nished railroad ties and lumber for prosecuting the great war. I doubt if the world affords a more striking example of conservation.

In the control of torrential erosion in the Alps and Pyrenees, with its disastrous effects upon farm lands in the valleys below, France has been confronted with a far more difficult problem. The difficulty lies in the fact that the problem is, at bottom, one in social economies. It is the old story of conflicting interests between mountain shepherds and lowland farmers, of isolated mountain folk, living under rigorous conditions and dependent upon pastoral pursuits, clinging obstinately to their ancestral rights and customs and resisting control for the benefit of the people of the plains with whom they had no community of interest.



REFORESTED LAND IN A FRENCH ALPINE REFORESTATION PROJECT

Torrential erosion in the French mountains is traceable directly to the denudation of their forests by over-cutting and of their grass lands by over-grazing. Under the *"ancien regime"* this does not appear to have been serious, partly because the mountains were thinly populated* and partly because of the rigid restrictions enforced by royal decree. The French Revolution either swept these restrictions aside or rendered them ineffective through lack of any agencies charged with their enforcement. The mountain population increased and for two generations was practically immune from outside interference in handling their growing herds. During the first half of the Nineteenth Century, the flood menace became steadily more alarming and was the subject of much investigation. French political thought, however, was still so strongly impregnated with the individualistic conceptions of the Revolution that legislatures were loathe to restrict the liberties of the mountain people. It required the terrible floods of 1859 to arouse the nation to action.

A law "on the reforestation of the mountains," passed in 1860, sought to stimulate forest planting in mountain districts by furnishing seed or plants and by paying cash bonuses for areas actually restocked with trees. The Council of State, furthermore, was empowered to establish by decree the boundaries of areas within which reforestation was essential to the public interest. Within each of these projects, Communes and private owners were required to reforest their lands or to turn them over to the state for this purpose. The private owner who declined to plant his land and carry out the other measures which might be prescribed, like the construction of brush dams, was expropriated outright, receiving the in-

* It is interesting to note that some of the mountain settlements originated with communities of refugees from religious persecution during the 17th century.

demnities accorded by the general laws concerning public works. He could reclaim his property within five years after planting had been completed by restoring the indemnities and reimbursing the state for the cost of its work with interest; or he could regain half of his property by restoring the whole indemnity and giving the state full title to the remaining half.

Communal lands were dealt with on the same principle as that followed in the sand dunes. Only the use of the land was appropriated, without indemnity, in cases where the Commune refused to reforest the ground itself. The property was to be restored to the Commune after the forest had been established and its cost to the public treasury had been recouped through the sale of wood. The Communes also could reacquire their lands, after planting was completed, by paying its cost or could reacquire half of the land by deeding the remainder to the state. The requirements and protection of the *"regime forestier"* were extended to all forests within the boundaries of a restoration project; and any grazing on them had to be sanctioned expressly by the forest officers of the state.

This drastic invasion of the private and community rights of the mountaineers had the effect that might readily be imagined were a similar undertaking launched in the southeastern mountains of the United States. The activities of the state were looked upon as designed primarily to curtail or prevent the use of the mountain pastures which the sturdy Alpine folk regarded as essential to their livelihood. The Communes also claimed, with a large degree of justice, that the practical effect of the law was to expropriate their lands without indemnity, for the high planting costs and rigorous climate made the prospect of a restoration of their property, after the state had recouped its outlay, extremely remote. The conditions in these respects were wholly different from those in the Landes. An attempt to appease the local sentiment was made by a supplemental law in 1864, designed to increase the grazing resources of the mountain areas by restoring the grass or turf on portions of the denuded and waste lands; but little appears to have been accomplished under this measure. Under these difficulties, the work progressed slowly and the question of "restoring the mountains" was a mooted one in the French Parliament during the 20 years following the passage of the law. Alarm was occasioned by the tendency of the policy to depopulate the mountains, for it was found that certain communities had moved out altogether as the result of its enforcement—which simply emphasizes the complex social aspects of the problem.

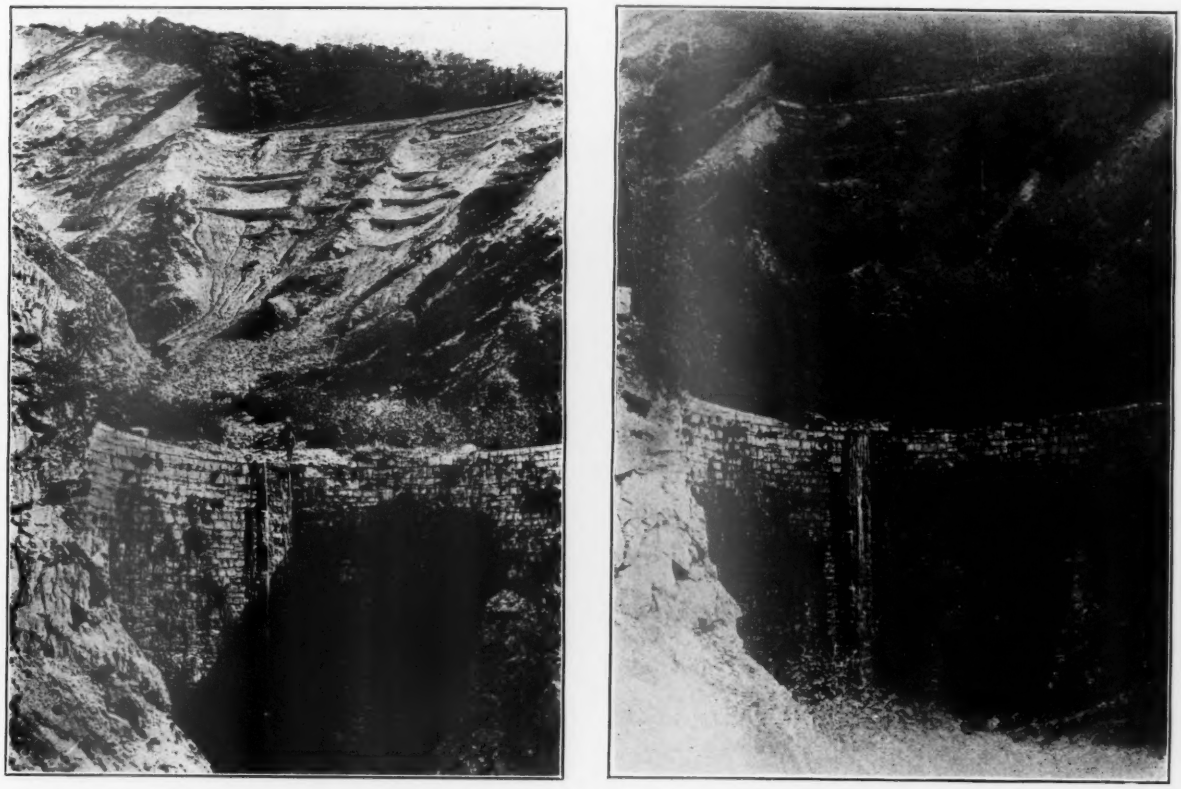
By 1882, the reforestation projects in the mountains had reached a total of some 350,000 acres. This included about 52,500 acres of Communal lands which had been actually reforested. In that year the whole policy was revamped. Under the terms of a new law, the areas where planting and other intensive methods were to be applied were greatly reduced, being limited to the immediate channels or slopes where torrential erosion was taking place. Within these restricted projects, all lands, private and Communal alike, were expropriated by the state with payment of full indemnities. Outside of the new perimeters, full possession of the ground was restored to its former owners, but any forests that had been established on Communal lands were kept under public administration in accordance with the general provisions of the forest code. The restoration areas thus became the absolute property of the state.

A new and important principle embodied in the law of 1882 was the establishment of large protection belts in the mountains, surrounding the limited water courses in which serious erosion was actually taking place and had to be fought by intensive methods. In these protective zones, designed to prevent the starting of fresh torrents, the public authorities were authorized to forbid any use of land or forest which would destroy the vegetative cover. And to extend further the general scheme of prevention, in which the earlier law had failed, the grazing of certain Communal pasture lands was placed under public control.

The difficulty in a straight-forward application of this policy and the desire to harmonize it with conflicting local interests to the last possible degree, as well as the administrative detail involved, are reflected in the slow machinery for putting the law into effect. Local forest officers prepare a minute plan of every proposed restoration project, with maps, lists of property owners, and cost estimates. This plan is subjected to (1) a public hearing in every village affected, (2) a review by the municipal council of each Commune whose property is included, with inevitable protests, (3) examination by the Council of the "Arrondissement," or County, (4) examination by the General Council of the Department, (5) examination by a special commission, consisting of the Prefect, or Chief Executive of the Department, representatives of the Communes affected, representatives of the various local councils, an engineer of "Ponts et Chausses" (bridges, highways and waterways), and a forest officer, and (6) review and approval by the Minister of Agriculture; and, in addition, the establishment of the restoration project must finally be decreed by act of Parliament. The forest officers then proceed to acquire the land designated, by friendly purchase if possible within maximum price limits fixed by the Minister of Agriculture, otherwise by public condemnation. Condemnation is resorted not only to extinguish property rights, but also the innumerable servitudes for use of timber, grazing, sheep or cattle driveways, quarrying, etc., which have so complicated forest administration in France and have often been a serious cause of erosion.

While the public acquisition and restoration of small areas where the immediate danger from torrents is acute has gone forward steadily on a small scale in spite of the difficulties encountered, little enough has been accomplished under the other provisions of the law. The procedure for designating and establishing protection belts, *"mise en defens,"* is practically as that required in creating the restoration projects themselves, except that the final word rests with the Council of State rather than

with Parliament. In the protection belt, any form of land use liable to create conditions favorable to slides or torrents—over-grazing, cultivation, the opening of quarries, etc.—can be forbidden or controlled by the Forest Service for a period of not more than 10 years, subject to an annual indemnity to every owner or lessee whose use of the ground is interfered with. At the expiration of 10 years, the landowner has the right, under the law, to compel the state either to withdraw its restrictions or to buy his property outright. French forest officers generally regard the expenditure of funds for such a temporary control of the use of land in the mountains as of little value in attacking the problem of erosion, and this feature of the law is a dead letter.



AN EXAMPLE OF FRENCH CONSERVATION

The first photograph shows the conditions of a gorge in France from which the torrent has washed the top soil and most of the vegetation. The second picture shows the condition twenty years later after the steep slopes of the gorge had been planted.

The attempt to control the grazing of Communal pastures is a similar story. This was the hardest nut to crack in the whole problem, but it contained the kernel of torrent prevention. Owing to their common ownership and the total lack of regulation, Communal pastures apparently were the hardest grazed of any. The members of the mountain communties frequently took good care of their own grazing land but vied with each other in getting the last bit of forage from the village commons. The result was not unlike what took place on parts of our public range in the old days. A good part of the turf was destroyed altogether and bad washes, gullying, and land slips became common. The Communal pastures through the French Alps, covering much ground above timberline and often occupying old lake beds and steep slopes at the heads of water sources, were a very important factor in the situation.

The control of grazing on these areas had extended on paper to some 325 Communes in 1901. In practice, tenderness in dealing with the mountain settlements has made it of no effect. The law of 1882 gave the Communes an opportunity to frame their own grazing regulations. These were to specify the land which should be pastured each year, the driveways to be used, the grazing period, and especially the number of each class of stock to be admitted. If the restrictions proposed by the Commune were satisfactory to the Forest Conservateur, they were to be put into effect by decree of the Prefect. As a matter of fact, the Communes have never proposed any regulations for their grazing lands, and this work has all fallen upon the Forest Service. The grazing plan prepared by the Forest Conservateur is passed upon by an advisory commission representing the Commune, the county, and the National Administration;* and may then be put into effect in the discretion of the Prefect.

Contrary to the principle adopted in most other features of this policy, the Communes have not been indem-

* In this, as in all other features of the policy, the attitude of the local commissions has been consistently hostile to the efforts of the Government.

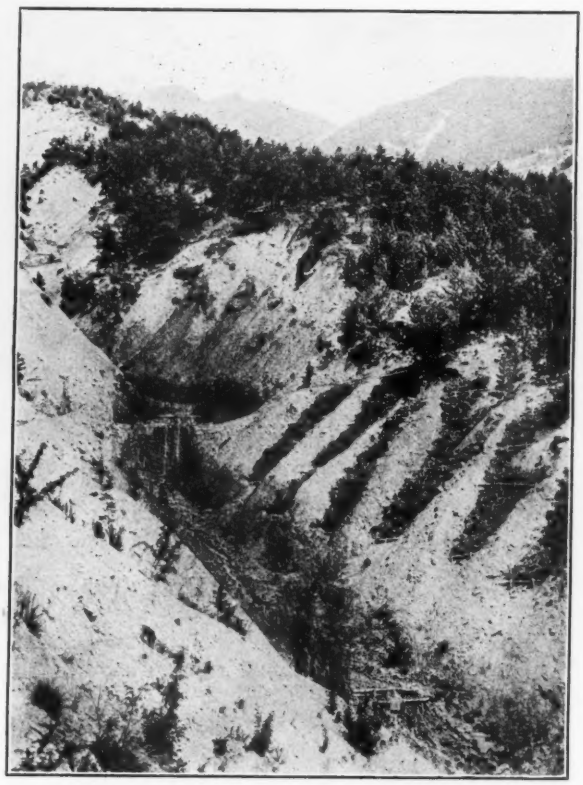
nined for reductions and restrictions in the use of their grazing lands. This fact has added to the tenacious resistance of the mountain villages against outside interference in handling their own property; while the low penalties of the law make an enforcement of the grazing rules ordered by the Prefect practically impossible.* An investigator reported in 1899 that out of the 300 odd Communes, the regulation of whose grazing lands had

SAVING A MOUNTAIN STREAM

This conservative project is being conducted by the placing of brush dams in the bed of the mountain torrent.

been prescribed, but 3 or 4 showed any appearance of regulation, and in no case was the regulation really effective.

While these human obstacles have largely nullified the broad protective and preventive features of the forest policy of France toward her mountains, she has accomplished splendid results through the public acquisition and restoration of limited areas where devastation was most acute. Aside from the Communal lands which were reforested under the earlier law, the state has acquired some 200,000 acres of mountain slopes and gorges. The checking of torrential erosion on these areas is an example of conservation by intensive methods fully as striking as the stabilization of the sand dunes. The line of attack is to reduce the trickling action of water on slopes, prevent the starting of gullies, and hold loose soil or rock in place. Tree planting is the primary method, but it may be necessary to stabilize the soil or stop the cutting action of streams before planting will be effective. Small gullies are blocked up with dams of sod or loose stones, brush rip raps or tree tops laid with the tip up stream and the butt fastened to a picket. Stretches of gully are often filled with brush, matted and criss-crossed and held in place by limbs thrust into the banks. More elaborate dams of rubble or masonry have been built in the main channels of many torrential streams, often at intervals of a few rods, in order to check the rush of flood water and afford soil-collecting basins which will ultimately be planted with trees. Rubble or masonry dams have also been constructed at various points to stop the caving in of banks or to check incipient or threatened land slips. The slipping of one layer of soil over another from saturation with water, a form of erosion common in the clay soils



FIGHTING SOIL EROSION IN FRANCE

The fresh gullies on the slope on the right have been filled with brush. The land above them has been successfully planted and planting of the slope will follow.

of the Southern Appalachians, has been combatted by the construction of paved, open drains, or gutters. Similar structures have been employed at a few critical points to confine the channels of streams. Slopes where snow avalanches are frequent and dangerous to villages have been dotted with walls of dry masonry, usually about 45 feet long and 6 feet in the clear on the upper side, so arranged as to overlap each other in the echelon formation of advancing troops. For these walls, low "berms" may be substituted, made by simply excavating platforms

* The Penalty is a fine of 1 to 5 francs for each offense, regardless of the number of animals, and can be imposed only upon the herdsman—not upon the owners of the stock.

six feet wide in the hill side. The ground behind such structures is planted as soon as practicable. Hardy shrubs are set out in masses of glacial drift or the talus of a slope where the ground is too unstable or too sterile to support trees; but the aim in all cases is to get the land in forest as soon as it can be done. The more elaborate masonry structures have been employed but little in later years, at points where particular villages, water power works, or railroads have required special protection.* The experience of the French has demonstrated that progress in the control of mountain erosion as a whole is measured by the spread of the "armor of the forest" over denuded slopes.

The restoration projects of the state are still supplemented by the effort initiated in 1860 to induce private land owners, Communes, associations of land owners or cheese-makers, etc., to protect their own holdings with public aid and co-operation. The state may furnish seed or plants for tree planting or improving pasture lands, or may co-operate in the construction of dams and avalanche breaks, or may pay the owner a fixed sum upon his completing plantations or other measures approved by the forest authorities. The amount or form of assistance is not covered by fixed rules. Each project is worked up by the local forest officers and submitted to the Secretary of Agriculture for approval. The aggregate amount of co-operative work of this character has not been great.

THE BED OF AN ALPINE STREAM

The torrents of water which swept down this water course have been in a measure held back by a series of barrier dams while trees have also been planted.

Many bills have been introduced in the French Parliament to give her mountain watersheds better protection. Nearly all of these have sought to create large protective belts, carrying out the principle of prevention which is embodied in the present law but has failed in its application. The proposed legislation is built up largely on three principles:

(1) The nationalization of much larger areas in the mountains, extending the perimeters of the existing restoration projects to cover the whole watersheds, not merely the parts of them where immediate erosion is active or dangerous.

(2) The placing of all forests in the mountainous sections of France under public control and giving them a special status as *protection forests.* Such areas would either be put under the "regime forestier" or made subject to special regulation forbidding the cutting of small trees without public sanction. One of the proposals would exempt protection forests in private ownership from taxation.

(3) The establishment of a *"regime pastoral,"* corresponding to the present *"regime forestier"* but covering private as well as Communal grazing lands in the mountain regions. Grazing would thus be regulated by the Service of Waters and Forests as public owned timber lands are now controlled, and the recalcitrant Communes would be compelled to submit to national regulation of their pastures as they were in 1827, in the case of their forests. The principle of the *"regime pastoral"* is exactly that which has been applied in the National Forests of the Unted States—to limit the number of stock grazed on every holding to what its forage will adequately support without deterioration. On Communal lands, it is proposed to allot grazing sights to every member of the Commune, thus dividing up the total number of sheep, goats or cattle which the Communal pasture will support. Under this plan, the individual citizen might either use his grazing right himself, or rent it to others.

Americans may well be gratified that the development of our National Forest policy at an earlier stage in the settlement and economic growth of the nation than the measures attempted by France has placed us in a much better position to protect our mountain watersheds. Everything proposed in the most progressive bills before the French Parliament can now be done on practically all of our mountain watersheds in the West under National Forest administration and can be extended to the watersheds of the East under the policy initiated by the Weeks Law. The lesson for us to draw from the bitter experiences and handicaps of France is to let no influence or local interest break up the national protection of our watersheds in the existing public forests or stop the extension of such protection to all important watersheds in our mountain ranges.

* These costly structures were undertaken, as a rule to protect local property or economic interests of special importance, where it was feared that protection from reforestation would come too late.

FORESTRY IN SOUTHERN NEW ENGLAND

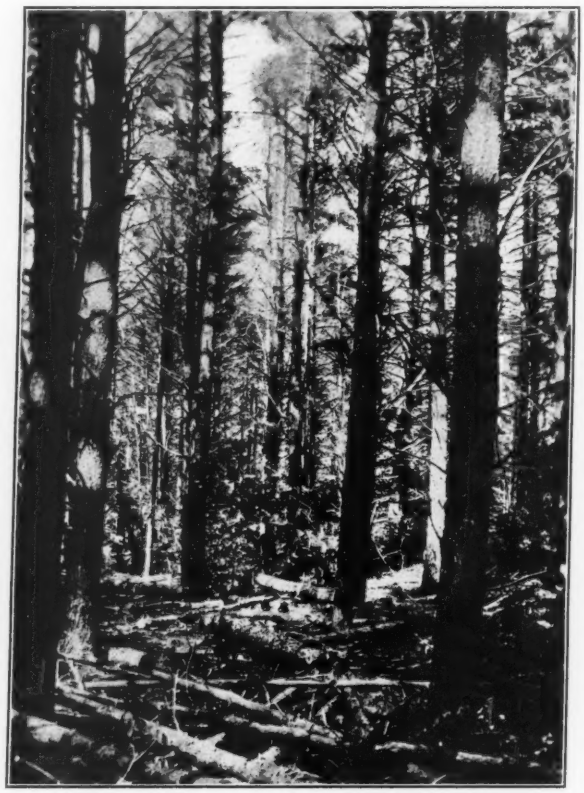
BY RALPH C. HAWLEY

PROFESSOR OF FORESTRY, YALE UNIVERSITY

SOUTHERN New England for our purposes may be taken as including the states of Connecticut and Rhode Island. This territory is one of the most thickly populated sections of the United States, surpassed only by Massachusetts and New Jersey. In 1910 it had a population of 281 inhabitants per square mile of territory.

Southern New England boasts of excellent transportation facilities. The New Haven System reaches into all sections of the territory. Roads, oftentimes of state construction, enable the use of motor trucks in bringing forest products from nearly every lot to the railroad. From the logging standpoint, the region may be said to be exceptionally well developed.

The region is primarily a manufacturing district. In 1910, 8.8 per cent of the population were engaged in agriculture, while 54.0 per cent earned their living through manufacturing and mechanical industries. These industries are of such character that they do not use wood as their chief product. Such an industry as the pulp wood business of Northern New England, utilizing softwood logs as its chief raw material, does not exist in this southern district. The industries require wood products for shipping their output or for minor uses in connection with manufacturing processes. The fact that forest products do not constitute the chief raw material for the local industries has great influence in determining the attitude of the population toward the forest resource.



JUST AFTER THINNING OPERATIONS

A thinning has just been completed in this white pine stand 58 years of age. 7000 board feet of lumber were cut and 27000 board feet left per acre in this operation.

The forest area of Southern New England is now about 46 per cent of the total land surface. This is equivalent to 1,750,000 acres of forest land. The area forested is apparently on the increase. In 1910 the forested area was estimated at 41 per cent, in 1850 as 32 per cent and in the Connecticut portion of the territory in 1820 as about 26 per cent. This is the lowest point to which the forest area has sunk since settlement of Southern New England.* The present forested area may be considered, with very few local exceptions, better suited for growing trees than for the production of agricultural crops.

Agriculture in Southern New England is essentially a minor industry as compared to manufacturing. The soils which are capable of profitable agricultural use in competition with better lands to the south and west, are already utilized.

It is interesting to note the ownership of the 1,750,000 acres of forest land. Roughly estimated, this is held as follows:

State Parks	0.25%
State Forests	0.25 "
Municipal Forests	1 "
Corporations	3 "
Lumbermen	1.50 "
Individuals	94 "

The National Government does not own forest land in Southern New England.

The forest is primarily hardwood in character. One type, called the upland hardwood, comprises over 80 per cent of the forest area. This was originally composed of chestnut, oaks and a variety of other hardwoods. As a result of the chestnut blight, chestnut will soon be exterminated in the commercial sense. The oaks remain as the principal trees. Less than 7 per cent of the forest area is occupied by the swamp hardwood type. Soft maple, elm, yellow birch, black and white ash, with other moisture loving hardwoods make up the composition.

Stands of pine—usually white pine, with some pitch pine—cover about two per cent of the forest area. This type is an intrusion into Southern New England of the pine region to the north.

Old fields occupy nine per cent of the forest area. Under this term are included the fields, both those cultivated and those only pastured which have fallen into disuse and are reverting to brush and forest growth.

*See "Changes in the Forest Area of New England in Three Centuries" by Roland M. Harper, Journal of Forestry, Volume 16, Page 442.

The character of the forest growth on these lands is decidedly different from the hardwood forests. Light seeded trees such as gray birch, soft maple, aspen and the common red cedar are the typical trees on the old fields. It may take a century or more for an old field to become completely stocked with trees.

Hemlock, as a type, forms about two per cent of the area, usually being found in ravines, and on steep, broken, rocky slopes.

As a whole the forests of Southern New England are of second growth, Two or more centuries of settlement has resulted in the destruction of all the virgin timber. The original forest is now replaced by second, third or fourth generation stands, composed largely of trees originating from sprouts rather than from the seed.

On the upland and swamp hardwood types, clean cutting has been the usual method of harvesting the crop. Such cuttings have resulted in continued production of hardwood trees. In some cases inferior species have been unsaleable and such material has been left to interfere with the succeeding second crop of more valuable trees.

The pine and hemlock lands, when cut over, tend to become stocked with hardwoods.

Forest fires have been far more destructive in rendering areas barren than have been the cutting methods. A majority of the fires throughout Southern New England arise from railroad locomotives. Hence the burned lands lie mainly in proximity to railroad lines. There is no large waste land type created by clear cutting and fires such as exists in Pennsylvania and the Lake States.

A FINE YOUNG RED PINE

This red pine is in a forest plantation fifteen years old and eighteen feet high. This sturdy tree is not so susceptible to disease and insects as in the white pine.

The holdings of forest land are too small for the individual owner to be able to furnish fire protection at his own expense. He must look to the state authorities to protect his property. As yet legislators in this region have failed to see the importance of the fire problem and still furnish small and totally inadequate appropriations for handling the fire situation.

The Best Forestry Practice for Each Type.

In the following paragraphs an attempt is made to outline various methods of treatment which have been tried on each of the different types and can be recommended as practicable.

Upland Hardwood.—During the last decade, removal of blight killed chestnut has been the chief problem. Where chestnut was thick and oftentimes pure over small acreas its removal leaves large openings in the forest cover. At the present time good stands of merchantable chestnut, even in a dead or dying condition, are scarce. Chestnut was the most valuable tree for management and following its commercial disappearance comes the question of what should be done with the hardwood type. Two methods have been advocated and are both in use. Under the first, many owners attempt to plant the lands cut over for chestnut with the idea of converting the hardwood type to stands of pine. Usually a dense growth of shrubs arises on cut over hardwood lands and the blighted chestnut sprouts come up quickly and live long enough to offer considerable hindrance to planted pines. These shrubs and sprouts must be cut back two or three times during the first decade after planting in order that the planted pines may live and make rapid growth.

Personal experience has convinced the writer that where planting of pine is attempted on cut over hardwood lands, the trees should be set widely apart (12x12 feet) and standing in the openings between clumps of sprouts. In this way three to four hundred trees per acre can be used, greatly reducing the original cost of the plantation as well as the cost of cutting back shrubs and sprouts which threaten to overtop the pines. The second method of treating the hardwood type after the removal of the chestnut, is to work for the production of hardwoods. Inspection of cut over areas which are unburned, will usually indicate that there is a sufficient stand of valuable seedlings and sprouts on the ground after the removal of the chestnut, to form an adequate stocking.

It is true that the yield of hardwood stands is much lower in merchantable timber than that of pine plantations, but on the other hand, the cost of securing the pine plantations is far greater. It is difficult to give accurate financial statements representative of the results secured by the two methods and which of the two is best

financially is, therefore, open to argument. Unquestionably there is room for both of these methods. There is far too big an area of the upland hardwood type to permit of its conversion to pine on a wholesale scale. The individual owner will find a relatively small area planted to pine all that he wants to work with. This is true because such plantations require a great deal of work in lopping back hardwood sprouts and seedlings of inferior species, which threaten to overtop the pines. When the gypsy moth is present, as is the situation in

SELECTION CUTTING

This shows a selection cutting in the hemlock type. The timber was about 100 years old and the openings made by this cutting are already stocked with hemlock seedlings.

the eastern portion of Southern New England, there is more reason for attempting to convert the hardwood type on a large scale to pine.

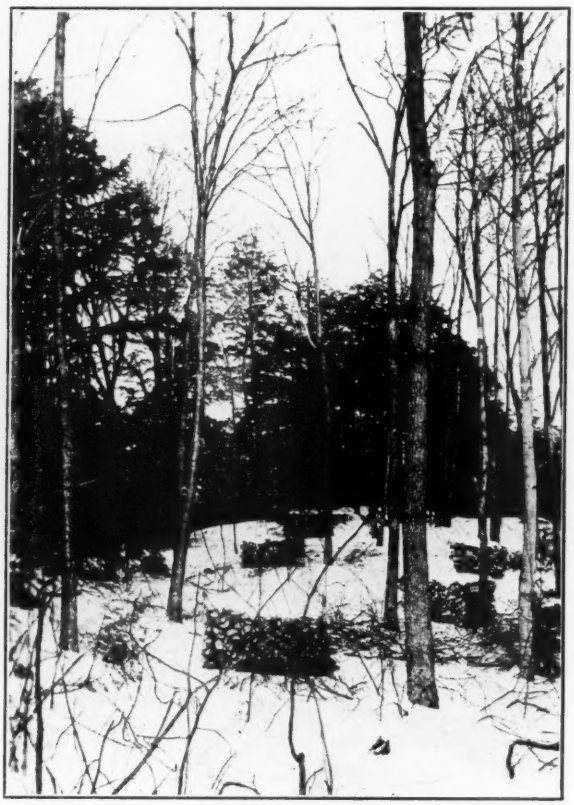
Some owners situated near good cordwood markets are making thinnings in their hardwood stands at an immediate profit. From their beneficial effect on the growth and increased yield of timber such thinnings are recommended even if the returns only offset the cost of the work.

Swamp Hardwood.—This type is usually cut clear and allowed to reproduce by coppice shoots. Growth in these swamps is rather slow. The ground is difficult to log except in the coldest weather when frozen.

Pine Type—Pine in Southern New England grows naturally on both light sandy soils and on heavy soils when it associates with hardwoods. On the former type of soil, natural reproduction can be successfully secured by removing the old stand in two cuttings. The first cutting takes out 40 to 60 per cent of the timber, leaving the balance well distributed over the area to furnish seed and shade to young seedlings. In a few years reproduction starts and within five or ten years, the remainder of the timber may be removed. A good illustration of what can be done in the way of getting natural reproduction of white pine on sandy lands may be observed on the property of the A. D. Bridge & Sons Company, near Hazardville.

On heavy soils, hardwoods compete with the white pine and usually reproduce before the pine. On such lands, probably the best policy is to cut the pine clear and then replant the area after this cutting.

Old Field Type.—Planting is the treatment required and commonly practiced for this type. White or red pines are used in planting. Southern New England lies quite largely south (or below in elevation), the range of



THINNING FOR CORDWOOD

A profitable thinning for cordwood in the hardwood type. The remaining trees will be left to grow to sawlog size.

wild ribes. In portions of northwestern Connecticut wild ribes are abundant. Elsewhere they are relatively scarce. Since the ribes are the hosts supporting one stage of the white pine blister rust, their presence or absence in the region is largely instrumental in determining the advisability of planting white pine. Outside of northwestern Connecticut, and possibly other small restricted areas, it may be considered safe to continue planting this tree. Red pine, due to its greater hardiness and freedom from insect pests, as well as from blister rust, is often

preferred. The writer inclines strongly to the use of red pine.

Three-year-old transplants are used in planting old fields where the grass sod is thick or low brush cover abundant. Where the sod is very light and conditions of competition with brush are not severe, smaller stock may be used. There is, however, less field for small seedling stock in southern New England than is the case farther north.

A good many individuals and corporations have planted considerable areas of this type already. The New Haven Water Company, with about 1,500 acres planted, probably heads the list. Many plantations in the old field type need subsequent treatment in order to protect the pines from encroachment of hardwoods. There are apt to be large hardwoods scattered on old fields with broad crowns which overtop the pines. These hardwoods are cut.

Hemlock Type.—A hemlock stand lends itself well to aesthetic treatment and where retained should be managed principally along such lines. The type located in cool, rocky gorges and on steep slopes occupies poor and relatively inaccessible sites from which the timber production cannot be high. As a commercial proposition hemlock lands are better planted with pine. When the aesthetic purpose governs the management, selection cuttings, with the idea of developing an unevenaged forest, are employed.

MAKING A LIBERATION CUTTING TO FREE WHITE PINE

Conversion of the upland hardwood type to pine. In this case the area was planted to pine before cutting the hardwoods. The stand was thinned twice before underplanting with pine. Now the remaining hardwoods are being felled.

Extent to Which Forestry Practice is Now in Effect.

As you go through southern New England, not much intensive forestry practice can be observed. The great drawback is the lack of the necessary wood capital in the forest. Most owners find themselves with cut over lands on which the timber is too young to admit of annual cuts and a regular income. The average forest owner is in a stage of development where he is marking time and waiting for his forest capital to accumulate by growth. When recently cut over land is acquired, a period must be spent of several decades in building up the wood capital before profits can be secured. Hence intensive forestry taken up now requires investment which will not bring annual returns for a good many years. Such an investment is impossible for a large majority of forest owners.

There are, however, more owners than is commonly believed who have benefited by the educational campaign and who are practicing forestry in a crude way and will practice on an intensive scale as soon as their wood capital is built up.

In many instances simple protection of the growing timber means a rough practice of forestry.

Another difficulty met with in practicing intensive forestry is in marketing cordwood and hardwood logs profitably. Although a densely populated region, the demand for cordwood is far below the available supply. It is often hard to find a market for many of the common hardwoods of southern New England. This is due partly to the scattered distribution of the hardwood timber, making it difficult to get a reasonable quantity of one kind of material at one place. Then, native hardwoods are of poorer quality than those grown in the South. This is not because high grade hardwood timber cannot be grown in southern New England. As soon as the virgin hardwood timber of the southern Appalachians becomes exhausted, southern New England timber will appreciate in value.

The extent to which forestry can be practiced differs with different classes of owners. In the case of the State Parks, and State Forests, they may be said to be already under management. On the State Parks the aesthetic idea of course predominates, but this need not interfere with the commercial production of timber on most sites. Nearly all the municipally owned forests are under good management.

Among corporation owned forests there is a difference in management depending upon the character of the owning corporation. The water companies, of which there are a number in this district, are all practicing relatively intensive forestry. This is true to a lesser extent of the brass industry which uses thousands of cords of wood in manufacturing processes.

In the case of the lime kilns and brick yards there is very little practice of forestry. Such plants are interested in cord wood which is a low grade product and which can

be secured by clear cutting wodland at a relatively early age. Yale University furnishes one example of a corporation practicing intensive forestry with a holding of 1,500 acres in this region.

The lumbermen who own lands in southern New England, with a very few exceptions, do not practice forestry. They mainly aim to sell their lands as soon as possible after they have been cut over. In a few cases quite intensive work is being carried on by lumbermen along the lines of planting, or in reproducing stands of pine.

Among individual owners, two classes can be distinguished. The first class would consist of city men of more or less wealth who have gone into the country either to live the year round or for summer homes.

WHITE PINE SET IN 1909

This plantation of white pine was established seven years ago. The trees are now growing in height at the rate of about 2½ feet per year. The large hardwood in the background should be removed.

These men, when they acquire forest property, usually desire to put the land to the use to which it is best suited and to bring it to a high state of productiveness. They are pursuing a similar policy with respect to their agricultural lands and are glad to do the same with the forest land. While this class of owners is increasing, it as yet owns only a small fraction of the forest area—probably around five per cent.

The second class of individual owners is composed mainly of farmers whose chief interest is in the management of agricultural land, and who cannot afford to make large investments to develop their forest land. As yet farmers have put into practice very little forestry, but it is probable that a large percentage of them have done some thinking on the subject, and as their timber comes to cutable size they will endeavor to handle it more conservatively than in the past. A difference can be noted in the attitude of the southern New England farmer to his woodland as contrasted to the northern New England farmer. The latter knows the value of young, immature trees, realizes the relative value of the different species and in his cuttings for cord wood or lumber is apt to take pains to save these smaller trees.

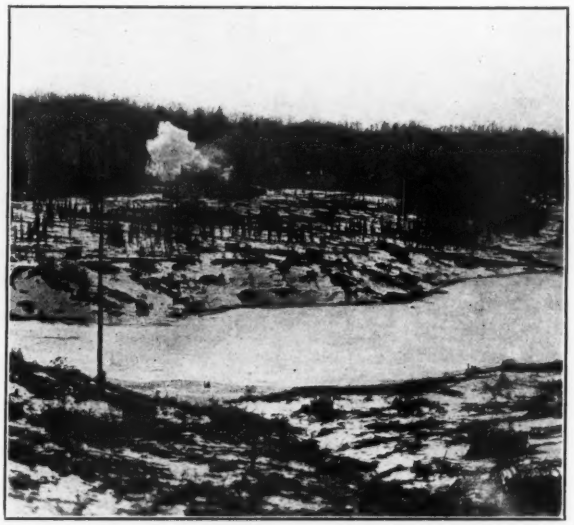
In southern Connecticut small trees as yet receive little or no consideration. This is due partly to the methods of cutting, which are mainly clear cutting and also to the fact that as yet special markets (more or less standardized) for each of the different species have not been developed.

For the rough practice of forestry, the chief essential is fire protection. This is true since the main type, upland hardwood, perpetuates itself by sprouts and consequently clear cutting does not necessarily decrease the producing power of the site.

For intensive work, thinning, in order to increase the production, longer rotations, in order to bring a larger part of the forest crop to timber size and planting of waste lands, are the important lines of work. As time passes and market conditions become better, unquestionably a large percentage of the present small holders will voluntarily take up more intensive methods.

Future Development.

Within the next decade or two, a large increase in the acreage of State Parks and State Forests should be effected. A minimum of half a million acres is not too large to look forward to as the ultimate goal for such ownership.



A PORTABLE MILL

Sawing away at hemlock and hardwood cut in a forestry operation. In the foreground a stand of timber 100 years old and yielding 30,000 board feet per acre was cut and the land planted with red pine transplants. The mill is set up in an old field which will be planted as soon as the lumber is hauled away. In the background is the hardwood type from which the chestnut has been removed.

Municipal forests may enlarge to some extent but it is not believed that a very considerable increase in this line of ownership need be expected.

Corporations as forest owners are apt to slowly enlarge their holdings, but here also it is unlikely that any great change will take place.

The holdings of lumbermen are more likely to decrease than to increase. As their present timber and the available supply that they can buy becomes exhausted, these men are apt to turn their attention to other lines of busi-

ness. They are interested, not in growing trees, but in harvesting timber.

Individual owners will keep control of the better lands and those that lie in smaller areas. Intensive work may be started at once by wealthy owners who can afford the investment, but on the great bulk of individual holdings, such work will only be started when it is able to pay its way. These individuals will remain holding the large part of the forest land. They must have State or Federal fire protection. They must be educated to lengthen the rotation on which their timber is cut and to produce a larger percentage of saw timber. They must be educated to carry on thinnings. Finally the development of forestry practice on these small individual holdings is going to be greatly stimulated if better and more copious market information can be supplied.

An arrangement for cutting and marketing forest products co-operatively would be of great value. As yet too little has been done along this line. The States have usually contented themselves with making a wood industry study which listed the names of men in different industries and gave general information about the character of the product and the amount used. This is not sufficient for the purpose of the small individual owner and it is believed that the State has got to go much farther along this line to develop the practice of forestry in southern New England.

On the whole, the outlook for the practice of forestry in this region appears encouraging. It will take time for accomplishment, but as the present young timber matures, and as the larger centers of timber supply are cut out and it becomes more and more expensive to import lumber, the price of local lumber is going up. Southern pine is expected to be practically exhausted in five or ten years and certainly by that time a decided increase in the prices of local lumber may be expected. Price increases will make possible more intensive work and will influence more owners to manage their woodlands as permanent crop producing property.

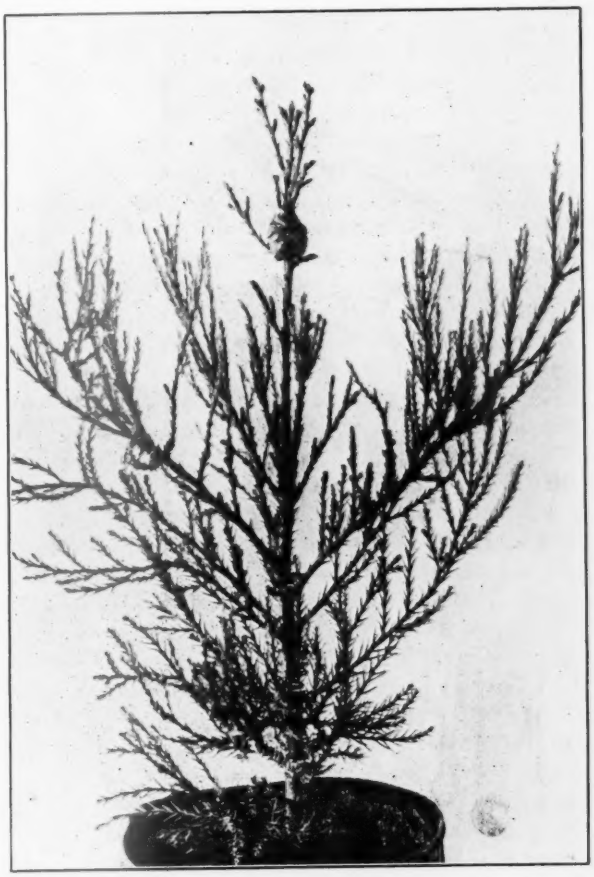
A PRECOCIOUS YOUNGSTER

Woodbridge Metcalf, Assistant Professor of Forestry, University of California.

THE Big Trees (Sequoia gigantea) of the California Sierra's have long been known as the oldest living things in the world. The massive proportions to which they attain and the tenacity with which they cling to life for two or three thousand years have made them famous throughout the earth. Here, however, is a youthful member of the ancient family which is not content to allow the grandfatherly ones to carry off all the honors but must do something unusual in its own small way.

In its fourth year from the seed this small Big Tree produced on its leading shoot a perfectly formed cone. This being infertile has not interfered with the terminal bud activity and the shoot is continuing its vertical growth from the apex of the premature cone. Surely this is an interesting demonstration of the fact that cones are simply modified branches, the leaves of which are also changed in shape to form the cone scales.

Other members of the taxodiaceae family, to which the Big Trees belong, sometimes show similar interesting growth variations which however do not appear so early in life. Trees of the coast Redwood (Sequoia sempevirens) are occasionally found having branchlets and foliage protruding from the apices of several cones. The important Sugi Tree of Japan (Cryptovenia japonica) often produces many such cones while still a young tree. In both redwood and sugi tree, however, such cones are generally found on lateral branches and not on the main stem.



THE FREAK BABY BIG TREE

This young Big Tree and another with a similar growth were pointed out to me by Mr. H. A. Greene of Monterey, where he had them growing in his unique "tin-can" arboretum. Mr. Greene was glad to give me the tree in order that it might be photographed for the information of readers of American Forestry.

CONSIDER THE WOODLOT TO KEEP IT PRODUCTIVE

WHAT OUR FORESTS SUPPORT

BY FRANKLIN H. SMITH, STATISTICAN IN FOREST PRODUCTS

THE American public has a vital interest in the perpetuation of our forests. This interest is not only in the daily necessities and comforts that the forests provide; the continued productivity of our forests has a deep economic significance for all the people. Wood in one form or another—rough, perhaps, as in the case of fuel, or refined, as in the case of a beautifully finished piece of furniture—is the principal raw material that enters into the making of thousands of manufactures and the turning out of these varied products involves the labor of millions of persons, backed up by the capital investment of billions of dollars. Should the forest crop be shortened, the manufacturer would be deprived of his raw material, and labor, in turn, would lack employment. So whatever tends to maintain an abundant annual forest crop is perforce an ally of the public, and whatever tends to diminish such a crop, whether it be poor utilization, carelessness, or fire, robs labor and the public of just so much of their rightful heritage.

The average man sharpens a lead pencil and notes the softness of the wood, the ease with which it cuts, and the smoothness of the sharpened surface; he feels the "give" or elasticity of his golf stick as he drives the small ball on its course toward the next hole; he gazes at the beautiful wavy grain of his highly polished desk or table top; but seldom does he stop to consider the source of the raw material, the means of utilizing the various woods, or how dependent he is upon the forest for the necessities, comforts, and even health of his every day existence. He takes the pencil, or the golf stick, or the desk as a matter of course, along with the other daily conveniences provided, without stopping to reflect upon what they really represent to him in facilitating his day's work, play, or rest, and how inharmonious his work-a-day world would be without these indispensable articles of wood.

Hardly for a moment from the time in the morning when Mr. Citizen rolls out of his walnut four poster on the second floor of his cozy shingled house, sets foot on the polished hardwood floor, stubs a toe against the rocker of his comfortable arm chair, and takes his razor from its veneered box on the wooden shelf in the bathroom, until he tumbles into the same four-poster at night does he lose contact with wood in some form or other. He may rest his elbows on the breakfast table of mahogany from an easy position in his wooden chair, while he glances over the headlines of the morning paper made of wood pulp. Selecting a cigar from the cedar box, which he lights with a match of pine, he closes the wooden door behind him as he goes out and takes either the plebeian trolley car of wooden type, or if he is fortunate enough to own one, a motor car, many parts of which are of wood, and so reaches his office. Thus it goes all day long—much that he touches or employs is of wood. In his office he is surrounded by desks, and chairs, and filing cabinets, and bookcases made of wood. The surface of the street he crosses, dodging heavily laden wagons in his hurry, may be paved with wooden blocks. And those same heavily laden drays bear merchandise of every sort securely contained in wooden boxes and crates. The very toothpick he may reflectively stick between his lips after luncheon is of wood. All of which brings us down to the point where we can seriously consider the great value of our forests and their economic importance to the wealth, independence, and prosperity of our country.

The wood-producing and wood-using industries of the United States form an important and interesting division of the country's industries. Some of them we immediately recognize as directly associated with our daily doings, while others we may look upon as being rather remotely related to the work or play of the day. Perhaps not all of the following named industries are completely descriptive, but the list will serve to indicate to the reader the general products manufactured: Lumber and timber products; planing-mill products, sash, doors, blinds, and general millwork; window and door screens and weather strips; wooden packing boxes; cigar boxes; barrels and kegs; turned and carved wood; lasts; wooden furniture, including rattan and willow; show cases; billard tables and materials; looking glasses and picture frames; sewing-machine cases; baskets and rattan and willow ware; coffins and burial cases; rules; matches; pulp goods; wood carpet; charcoal; treated and preserved woods; carriages and wagons; airplanes; agricultural implements; dairymen's, poulterers', and apiarists' supplies; wood for engraving; musical instruments and materials; paper and wood pulp; phonographs and graphaphones; tobacco pipes; refrigerators and kitchen cabinets; ships and boats; toys and games; turpentine and rosin; washing-machines and clothes-wringers; wood distillates; artificial limbs; professional and scientific instruments; handles; clocks; playground equipment; printing material; trunks; shuttles; spools, and bobbins; firearms; pulleys and conveyors; patterns and flasks; pumps and wood pipe; tanks and silos; bungs and faucets; brooms and carpet-sweepers; paving materials; plumbers' woodwork.

A mere glance at the list must awaken in even the unobservant person a realization of the great diversity of those forest products that enter into his or her daily routine. Wood is peculiar in that while it is not fabricated like iron or steel it readily lends itself to almost any combination or fashioning where the main requisite is strength, lightness, toughness, softness, ease of turning, quickness of working, beauty of design or finish, durability, or a grouping of several of these qualities. The uses of wood are multitudinous and so commonplace that its indispensability is rarely given a thought. To deprive man, even to a limited extent, of such a friend as wood, which nature has so lavishly provided

in quantity and quality, would prove to be a dire deprivation. Our forests must be loved, protected, and encouraged as friends.

Forests play a leading role in the country's economic life, since from them comes the raw material that supports a large share of its industries. Even a hasty analysis of the available figures brings this fact most forcibly to mind.

Census data for 1914 show in round numbers 276,000 establishments engaged in manufacturing, and of this vast number 52,000, or 19 per cent are establishments depending solely or in part on the products of the forest for raw materials used in their varied lines of manufacture. In other words, nearly one-fifth of all the the manufacturing establishments throughout the country use timber in one form or other, and they would be handicapped by decreased supplies and forced to cease working if no wood were obtainable.

Employment is given by the 276,000 manufacturing establishments to 7,000,000 wage earners. Of this vast army of toilers, who keep the wheels of industry moving, 1,130,000, or 16 per cent earn their wage in the 52,000 wood-using plants. To a man these wage earners should be interested in the proper use of our forests, for from the annual crops must come the wood which they handle to make their livelihood.

The manufacturing establishments of the country pay out annually in the aggregate 14¼ billion dollars foı raw materials, and the part of the wood-using industries in that huge expenditure amounts to more than one billion dollars, or 7 per cent. The value of the products of the 52,000 establishments amounts to nearly 2½ billion dollars a year, or 10 per cent of the toal value of all manufacturers. The value of the products of the wood-using industries is slightly more than doubled by the process of refinement at the hands of the more than a million wage earners. The capital invested in the 52,000 plants, totalling 3 billion dollars, is 13 per cent of the aggregate investment of 22¾ billion dollars in manufactures.

These are huge figures and their very magnitude makes them difficult of ready perception. But in no other way, perhaps, can the greatness and wealth represented by the wood-using industries of the country be pointed out. One inhabitant of every 100 forming the 100 million population of the United States is a wage earner whose earnings depend upon the uninterrupted supply of raw material from the forest. And if that wage earner is married and has a couple of children, that many more mouths to feed and bodies to clothe are directly affected by anything that tends to impair our forest resources.

Only the material side of the forest question has been touched upon here. Nothing has been said about the necessity of our forests for protecting the sources of water supply, for the recreation and health of those who should have the advantage of nature's playgrounds, or for maintaining an equable climate in different regions. These problems are not ethical but practical and urgently require attention.

From the economic as well as the human standpoint, are not our forests worth protecting?—protecting from improper utilization, careless logging, and criminal carelessness about fire? In the light of the statistics, every citizen should find it to his interest to support a constructive forestry program.

ROCK CREEK PARK WHERE STATESMEN MOTOR

The world's champion park for a motorist is Rock Creek Park, Washington, District of Columbia, the blooming capital of these broad and sovereign United States of America, writes Burt P. Garnett in Motor Life.

When somebody or other made some sort of a deal with Alexander Hamilton, first secretary of the Treasury, which resulted in the location of the capital on the Potomac River, between the sovereign states of Maryland and Virginia, that somebody proved he was a lover of nature and a person of unassailable taste in his appreciation of rocks and rills and templed hills and trees and birds and flowers.

Some argumentative person in Denver or Los Angeles or Portland, Oregon, will immediately put in a demand and make an effort to refute the foregoing information. Rocky Mountain folk and the peoples of the Pacific Coast always have had a hopeless sort of feeling about the rest of the country. They know that Estes Park and Lake Tahoe and the Columbia River country are much more beautiful than any other section of the world, but they have practically despaired of ever getting the national capital moved from Washington to Denver to Portland or Los Angeles, because the great masses of the people wouldn't understand. And it's rather too big to tackle to transport every voter in the country to these various places and show him the overpowering reasons why the capital should be moved.

Nevertheless, and in the almost certain knowledge that the foregoing statements will be flatly contradicted by loyal native sons of this state or that, Rock Creek Park is our candidate. We cast our vote right now and hereby adopt resolutions to the effect that whereas Congress in its wisdom in the year A. D. 1889 appropriated sums of money to purchase certain wooded area in the valley of Rock Creek to be set aside as a National Zoological Park, and,

Whereas, in the year A. D. 1880, Congress in its increasing wisdom appropriated certain other sums to buy other wooded area adjacent to and adjoining said National Zoological Park for the purpose of a public park, therefore be it resolved.

That Congress was decidedly hep to what was good for the nation, and, by heck, it deserves the thanks to the folk of this here District of Columbia, the A. A. A. et al. too numerous to mention.

MAMMY COTTONTAIL, RACING FOR HER LIFE, DARES A CROSSING ON THE THIN ICE OF THE RIVER

MAMMY COTTONTAIL AND TROUBLE.

BY ALLEN CHAFFEE

AUTHOR OF

I. "THE ADVENTURES OF TWINKLY EYES," THE LITTLE BLACK BEAR

(WITH ILLUSTRATION BY PETER DA RU)

MAMMY Cottontail, the little brown hare, found herself in a part of the woods she did not know. Never before had she dared to venture so far from her home in the Old Apple Orchard.

But one snowy day the Red Fox Pup had seen a hump of brown on the root of a beech tree, and the hump had suddenly moved!—And getting to wind-ward of the uncanny thing, he had found that it was the brown bunny.

The chase that followed had led to the icy bank of the river, where Mammy, racing for her life, dared a crossing on the thin ice, and where, light as she was, she barely made the other shore.

Then, sitting up straight, with her little brown paws crossed on her furry chest, and her pink-lined ears pointing forward, she had watched as the Fox broke through into the icy currant.

For his part, the Fox Pup was glad enough to be able to scramble back to the bank he had left, and trot off home-ward, with his plume of a tail dragging water-soaked and heavy behind him.

So far, so good! But Mammy now found herself in a strange new part of the woods.

Hiding, trembling, under a juniper bush, she waited till mid-afternoon, before her heart stopped hammering at her ribs.—Then, circling back to the river, she found to her dismay that the ice had softened, till there was nothing but a scum of floating mush to cross on.—She could never get back the way she had come!

Where could she hide from the many foes that might want rabbit for supper? She cast bulging eyes down the frosty aisles of trees.—Mercy! What was that strange scent on the wind? (A scent too faint for human nose to tell, yet warning enough for a bunny).

No time to explore! She must hide at once!—And with terrified leaps she was back under the juniper bush, where at least nothing could come on her from above.

For half an hour she crouched there. Then, so suddenly that she started in spite of herself, she heard a loud thump-thump-thump right behind her!

"Who are you?" the thumping heels of the newcomer signalled.

Then came a louder, angrier thump, three times repeated, which in rabbit code said as plainly as words: "Well, I like your nerve."

The Trail of the Weasel.

Mammy Cottontail stirred nervously. For again came that warning thump, which said in rabbit code: "I have first right to that juniper bush. And if you don't clear out in just three shakes of your left hind foot, you are going to get in bad with Madame Wood Hare."

Mammy had, without a doubt, stumbled upon the home of the other bunny. But where could she go? These woods were full of enemies. Should another fox set after her, where could she hide?

Rolling her eyes around pleadingly at Madame Wood Hare, she had just about decided that it was safer to chance the wrath of her unwilling hostess, when the newcomer gave her a surprise. Leaping straight at Mammy's head, Madame Wood Hare gave her such a blow across the nose with her long hind feet that Mammy whimpered with the pain of it.—Of course she had to vacate.

And before ever the owner of the form under the juniper bush could give her a second blow, the little brown hare was darting away in long, tired leaps through the wind-swept woods.

There was a patch of willow shrub by the river, and Mammy would have liked to wait for night-fall and make a dinner off the tender tips. But she was not long in finding out why Madame Wood Hare had turned her out. It was because she needed her own house to hide in.

For not far back in the woods, Mammy came across a trail that was new to her,—a delicate, lacy trail with the tiny, sharped-toed foot-prints of some long, slim creature with nails that could climb a tree trunk. And clinging fresh to those foot prints was the musky scent of a flesh-eating animal.

Mammy's teeth chattered with freight. It was undoubtedly the trail of a weasel, most dreaded of all her enemies!

Yes, there could be no mistake about it.—Here the tiny trail ran straight up a tree-trunk, and a blood-stained feather on the ground beneath told its own story of a chickadee's nest left empty.

And there,—high in the tree tops, was the sudden chattering of a terrified squirrel.—Good! The squirrel had reached his hole. He turned, presenting a mein of such long fierce teeth that the weasel must have hesitated as to whether it was quite worth while.

What should Mammy do? For the weasel might at any moment see her leaping through the snow, or cross her trail,—and then it would surely be all up with her.

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FORESTRY AND RECREATION IN THE PALISADES INTERSTATE PARK

BY GEORGE W. PERKINS, PRESIDENT

COMMISSIONERS OF THE PALISADES INTERSTATE PARK, STATE OF NEW YORK

FORESTRY has come to have a new meaning. Happily, no longer is the conception of American forestry limited to the commercial production of lumber. As Dean Hugh P. Baker, of the New York State College of Forestry, has recently remarked, the broader conception of forestry must ultimately embrace the social uses of forest domains for the health and recreational benefits they can yield. This ideal of forestry is one not new to the Commissioners of the Palisades Interstate Park, for they have, in their administration of this public park, applied, in a practical manner, the very heart of this broad and deeper meaning. The conservation movement, as an organized effort to preserve for economic and other reasons the natural resources, was new when the trap rock interests began to destroy the historic and ancient headlands, which for twelve miles adorn the west shore of the Hudson River from Fort Lee, opposite 129th Street, New York, to Piermont, N. Y. A writer, in *Puck*, many years ago said that if the Sphynx was situated on the west shore of the Hudson, the stone interests would not have hesitated to blast it to pieces to sell it by the yard! Had it not been for the interest of a group of people, these rocky embattlements, which are said by naturalists to have attained the ripe old age of thirty million years (and for all that still look young and hardy!), would have been reduced to the squalid docks, factories and dwellings which, on the south side of it, present such an ugly contrast to the region north, which was saved. It will always be said, to the lasting credit of the late

Mr. George W. Perkins, the author of this article, has for more than twenty years been the president of the New York State Commissioners of the Palisades Interstate Park. Despite his great interest in politics, finance and social endeavor, Mr. Perkins has personally directed the acquisition and utilization of the Palisades Park area. In this development he has, in addition to his own generous donations to the work, raised millions of dollars from private sources, to carry this interesting project forward.

Mr. Perkins' description of the use of various lands is a timely one and will provoke much thought in forestry circles. It will be remembered that it was Mr. Perkins who supported Mr. Roosevelt, who gave such an impetus to the whole conservation movement.—Editor.

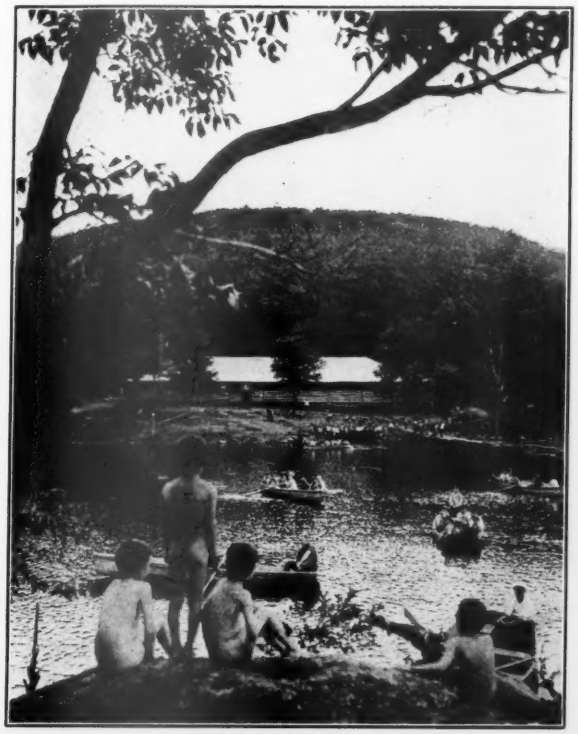
A PATH ON THE PALISADES

Just ten minutes from Broadway—yes, unbelievable as this sounds, it is true and the region is becoming a familiar one to the people of New York. The Park offers varied opportunities to the pleasure seeker—strenuous exercise or the quiet enjoyment of all that there is of beauty.

J. Pierpont Morgan, that it was his generosity in contributing $125,000, which finally bought off the quarrying operations and stilled forever the drill which would have reduced these mighty ledges to a desert of waste.

Nearly twenty years of acquisition and development have now made possible, through legal enactment, the preservation forever of the Palisades from Fort Lee to Piermont, as a public park.

The administration of the Palisades was entrusted to a joint Commission appointed by the Governors of New



A CAMP WHERE UNDERNOURISHED BOYS ARE MADE WELL

Here is offiered every possible enjoyment to the small boy of New York—and a wonderland of unknown joy and beauty, a new world, to many of the poorer youngsters of the city.

York and New Jersey, respectively. The members are: New York Commission—George W. Perkins, president; Franklin W. Hopkins, vice-president; J. Du Pratt White, secretary; Edward L. Partridge, treasurer; Richard V. Lindabury, William H. Porter, W. Averell Harriman, Frederick C. Sutro, Charles W. Baker, John J. Voorhees.

New Jersey Commission—Richard V. Lindabury, president; Edward L. Partridge, vice-president; J. Du Pratt White, secretary; Frederick C. Sutro, treasurer; George W. Perkins, Charles W. Baker, Myron W. Robinson, John J. Voorhees, William H. Porter, W. Averell Harriman.

This Commission is an unpaid, non-partisan group and derives its powers from legislative enactment.

How this area has come to fall within the broad conception which Dean Baker has described is evident in the following summary of the development for recreational uses to which this region has been put:

(a) Paths extending along the 12-mile front have been laid out, which rise and fall amid the pristine splendor of this region. Situated as it is within a ten-minute ferry ride from crowded Manhattan, this oasis serves as the breathing place for thousands of people annually.

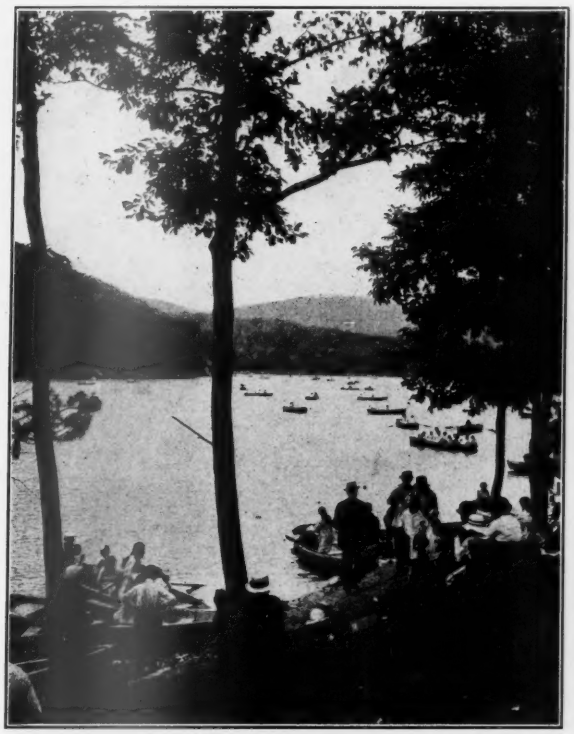
(b) Pavilions constructed on the plan of preserving the natural characteristics of this region, have been erected where the visitor may rest quietly, to enjoy the remarkable scenic effects apparent from any place along these walks.

(c) Canoe and motor boat basins have been built, which serve to meet a need nowhere else met near this point for the water recreations highly valued by a large part of the population.

(d) The Henry Hudson Drive, now under construction, will pass through this region and give to the motorist an opportunity to enjoy this natural park area now available chiefly to walkers.

(e) A large bathing beach and bath house were opened last summer, affording accommodations for thousands to bathe in the Hudson.

(f) When first acquired the land at the base of the cliffs was hard to reach, which made difficult the problem of the use of the Palisades. As a result, for years the Commission has been changing all this and making land, until now spacious play-



A TYPICAL LAKESIDE PARTY

The Park is the mecca of New Yorkers on highdays and holidays—not to mention Saturday afternoons!

grounds and ample walks along the shore line have opened up this entire region to the public, and converted that which would otherwise have been merely for the delectation of the eye into a thing for the physical development and spiritual joys of the people.

Conscious of the good which has accrued as the result of the preservation and recreational uses of the Palisades

Park, the state transferred to the Commission a 700-acre tract of land, lying between West Point and Jones Point on the west shore of the Hudson, about forty miles north of New York, which was purchased for a prison site and later abandoned.

Mrs. E. H. Harriman, who owned vast tracts in the Arden Valley, near Tuxedo, at that time conceived the plan of sharing a part of her Arden estate with the public for the development of a public park. This beneficent idea took the form of a donation to the Palisades Park Commission of 10,000 acres of land and $1,000,000 in cash, which have made possible the opening up of a region of unrivalled beauty to the public for recreational purposes. There have been added to these 10,000 acres, various tracts purchased both from state funds and private contributions. Together with the Hook Mountains and Blauvelt acquisitions, the Palisades Interstate Park embraces an area of over 35,000 acres.

The chief problem which presented itself in the acquisition of this area was how to preserve the natural splendor of the forest, protect its wild life and develop its resources so that the public could secure the maximum benefit from such a development. How this was done and what has been accomplished forms a romantic chapter in park development in the United States. Briefly summarized, some of these accomplishments are as follows:

(a) The abandoned prison site was made into a vast playground. This is located at Bear Mountain. Over a half million people visited this section during the summer of 1919.

(b) Bear Mountain Inn was established with private funds, which supplies refreshments to hundreds of thousands annually.

(c) Hundreds of boats have been built by the Commissioners and during 1919 over 400,000 people enjoyed the free boating privileges at Hessian Lake.

(d) Tennis Courts, running tracks, baseball diamonds and handball courts have been developed on the plateau at the base of Bear Mountain, all for the free use of the public.

(e) Pavilions have been built which, in addition to serving as a place of rest and recreation, also care for thousands of tons of ice annually, harvested from the lakes, for the summer uses of the Park.

"K. P." AT A BOY SCOUT CAMP

Deeply engrossed in the absorbing task of separating the beloved "Murphy" from his skin, these boys will reap the benefits of self-reliance and vigor which come from camping in the woods. The ideal of the Commission has been to make possible an out-of-doors existence which will mean much to such boys of health, education and pleasure in future years.

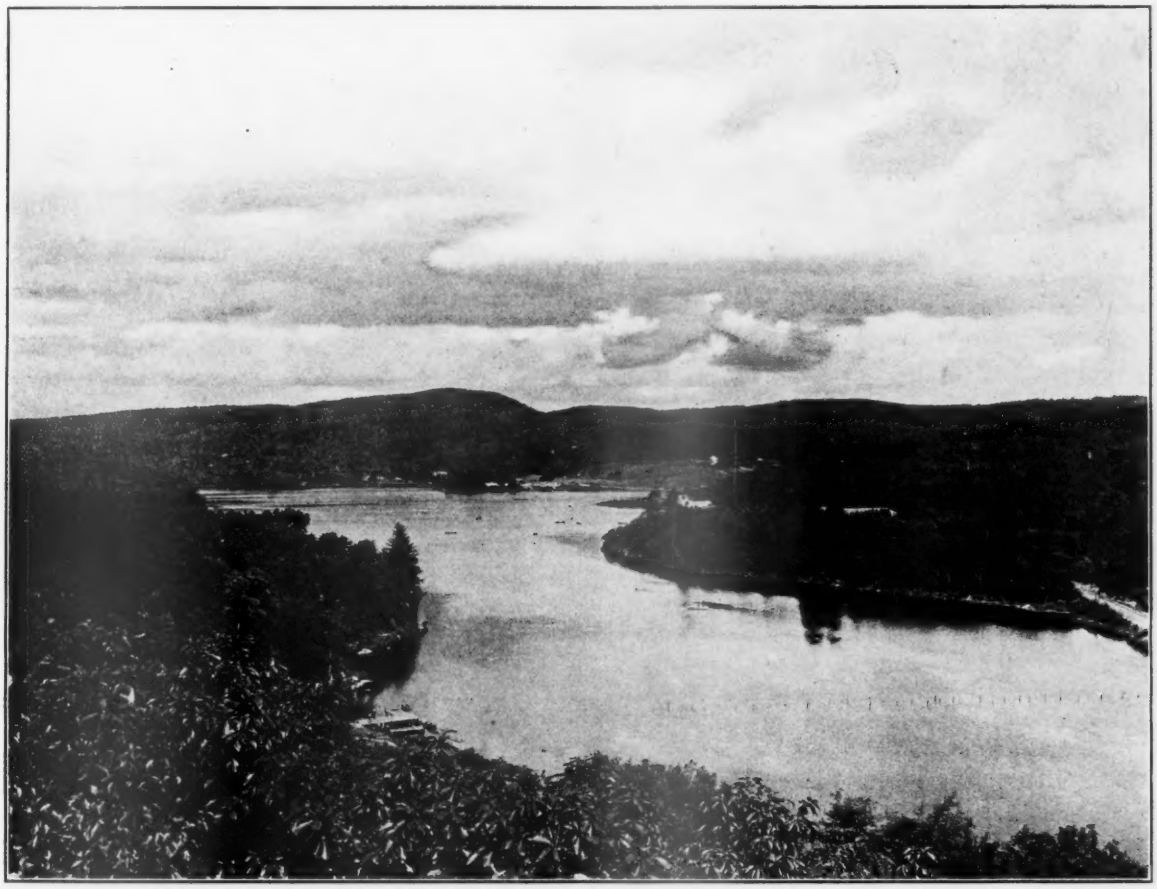
(f) Over 150 miles of fire trails have been laid out which, in addition to protecting the woodland, serve as a means of encouraging mountain hikes.

(g) A seventeen-mile drive, extending from Bear Mountain almost to the town of Tuxedo, has been built. Intersecting with the secondary roads of the Park, the drive makes a road system in the Park, which touches every important point.

(h) Seven artificial lakes have been made, while two others are in process of making, thus enhancing the value of the Park as a recreational area.

A VIEW FROM THE PARK DRIVE

The Palisades Park comprises a region unrivalled for natural beauty. This is a spot on the drive, looking north up the Hudson.



A QUIET DAY IN THE PARK—A PANACEA FOR THE ILLS "ALL FLESH IS HEIR TO."

The Lake, the hills, the clouds, the Park itself—all combine in a formula for health generously dispensed freely by the State to its people.

(i) A system of transportation has been arranged for, so that thousands who do not own motor cars have an opportunity to go into the interior of the Park. Last summer thousands of passengers were carried in these omnibuses.

In the field of recreation, the most notable achievement of the Park is in its camp work. Last summer over 50,000 people, mostly children, spent an average of eight consecutive days each in the camps. Those interested in forestry will, I am sure, be particularly impressed with the plan, by which this recreational phase of the Commission's work has been developed. Rustic cabins, built in harmony with the surrounding country, have been placed unobtrusively, usually on the lakes. The logs from which the cabins were built were the dead chestnut trees in the forests; the lumber used comes from the Commission's own mills, three of which are operated and which, during a year, produced more than two million feet of lumber. Slabs—usually a waste product of the mill—have been used extensively in camp buildings, thus utilizing what would otherwise be a waste product and which, in no small measure, beautify the buildings. Water from protected sources is tapped and brought into the kitchen of the mess hall. Beaches have been made at the lakes, to make possible safe bathing for the timid. Over five million trees have been set out in the Park, so that the future may not be unprovided for by the needs of today.

To many people, camping has come to mean a lowering of the standard of decent living. Unsanitary living conditions have often been mistaken for the romance of primitive living. Irregular food habits have been looked upon as the necessary concomitant of camping. The ideal of the Commission has been to preserve all the self-reliance and vigor which come from camping in the woods, while at the same time, providing the means by which an out-of-doors existence is made to mean something in terms of health, education and pleasure.

THE FORCES OF NATURAL CONSERVATION AND HUMAN CONSERVATION TAKE COUNSEL BY THE FIRE-SIDE

George W. Perkins (seated, reading from left to right), for twenty years president of the New York State Palisades Park Commission; W. A. Welch, General Manager of the Park; Dr. Edward L. Partridge, a Commissioner and among the first to suggest the preservation of the Highlands of the Hudson, now the Bear Mountain Park region; Hon. George D. Pratt, Conservation Commissioner of the State of New York. (Standing) Edward F. Brown, of the Commission staff.

I have always been impressed, in a deep study of the food problem, with the fact that people are not so much

affected by the lack of an adequate supply of food as they are by the poor selection and poor preparation of the foods they use. We have, therefore, given particular pains to the development of a food service in the camps, which would yield a maximum of nourishment with a minimum of waste and exertion. The food problems in most of the camps, which are spread over a large area in the Harriman Park, are somewhat alike. The large food manufacturing facilities at Bear Mountain Inn have been harnessed to meet the needs of the camps, by cooking in a wholesome manner, on the basis of a standard dietary, and transporting the food in heat-retaining receptacles to the various camps, some of them seventeen miles from the point of manufacture. Over 150,000 meals were served in this way last summer, and it is with increasing satisfaction and success that this system is being developed for the following, among other, reasons:

(a) The Commission can purchase in large quantities, thus securing special concessions, taking advantage of discounts.

(b) A standard dietary can be followed with intelligent help.

(c) There is uniformity of weight and measure, avoiding waste.

(d) There is uniformity of quality as against the haphazard quality in cooking in individual camps for small numbers.

(e) During 1919, the Commissioners supplied 21 meals a week of balanced rations, yielding a minimum of 2,500 calories per day per child, at the rate of $4.00 per week.

A POINT OF HISTORIC INTEREST

This is the old Queensboro Furnace—dating from the days of the Revolution.

We are particularly interested in this phase of the scientific development of recreational facilities, because it makes possible camp operations at a minimum cost, while yielding the maximum good. I earnestly hope that in the thousands of school camps throughout the country, in the hundreds of labor camps at industrial centers, in the summer camps of forestry schools, it will be possible to follow a standard dietary, which redounds immeasurably to the health and efficiency of campers. In the industrial world, manufacturers are coming to realize the close relationship between efficiency and food, and there is a great demand, through the impetus of the war particularly, to supply wholesome food to workers in the interest of health, efficiency and production.

I have a great faith in the possibilities of the new conception of forestry. The era of discouragement, which is patent to all great movements, will pass, in my opinion, with the education in forestry which will come through contact with the people's forest preserves and public parks. It is in this that I believe the Palisades Park Commission, in bringing hundreds of thousands of people to the Park, who, in close contact with nature, come to love and reverence the living thing in the forest, is adding to the sum total of the conservation movement. While, in the Palisades Park, we are particularly interested in the recreational aspect, we feel, nevertheless, that the maximum utilization on a broad social plane of the recreational facilities in the Park depends chiefly upon the application of sound principles of forestry. Haphazard forestry, the denuding of our forests without providing for what we take away, must give way to the scientific program. We have not yet touched, in my opinion, the great relationship between the food supply of the country and the forests with their food products. It is for that reason, for example, that the Palisades Park Commission, during the last summer, welcomed an opportunity to co-operate with the New York State College of Forestry in a scientific survey of the fish in the lakes of the Palisades Park, and the possibility of their development for food and game purposes.

There is another side to the problem with which we grapple in the Palisades Park; more human and more interesting. It is what the little child, sun-starved in the tenement slums of the large cities, gets from his brief outing in the lap of nature. It is here where scientific conservation of our natural resources touches that deeper, more vital problem of the conservation of the human resources, and I want to speak briefly about it. There are hundreds of thousands of children in the large cities of the state, and for that matter in the whole country, who, owing to the economic condition of their parents, or some other cause, are hemmed in in windowless bed-rooms, and city streets, during the most impressionable period of their lives. Their later outlook of life is in no small measure determined by their contacts and impressions as they gather them up in the city streets and in the crowded slum districts, where perverted views play with the development of character. The Palisades Park

affords opportunity to social organizations to bring the children to the Park. Here the under-nourished, play-starved child finds in the verdant splendor of the woods a new life.

Never before was the need for strengthening the physical fibre of our young citizenship more pressing. The report of the examiners of the War Department as to the physical condition of recruits is, to say the least, a document which might well engage the attention of the preservers of the nation. The opportunities, therefore, given through the camps of the Palisades Park, at its health and recreation stations, are vital factors in the conservation movement. The work in this field, briefly summarized, consists of:

(a) Establishing standard camp plants, where approved social and civic organizations may bring their charges.

(b) Standardizing, as far as possible, the administration of these encampments, so that the child derives the largest benefit therefrom.

(c) Standardizing the dietary, in order to insure to each camp an adequate supply of nourishing food.

(d) Formulating recreational programs, in order to wholesomely occupy the time of the child.

(e) Formulating and carrying out a nature study—educational program through bird walks, under the leadership of bird experts; fishing excursions; hikes, etc.

(f) Developing the trails of the Commission in such a way, so that, through the use of unobtrusive signs, the walk becomes a study in nature's laboratory, rather than an aimless hike.

The extent of this operation can be gauged when it is remembered that these camps stretch from the lower Palisades region to the Highlands of the Hudson and west as far as Central Valley. In addition to the camps for the children who come from charity associations or settlements, three lakes are devoted to Boy Scout activities, the annual daily census of this group during this summer having been 1,600 boys. There are also the camps for self-supporting working girls, who pay moderate sums, for which they procure all and more benefits than are derived from the conventional, commercial boarding house.

THE CALIFORNIA GRAY SQUIRREL AN ENEMY TO THE DOUGLAS FIR

BY J. HOOPER BOWLES

THE California Gray Squirrel, sometimes known as the Oregon Gray Squirrel, has been a resident of the State of Washington ever since 1896 to my personal knowledge. At that time it was by no means common, largely owing to lack of legal protection, in my opinion. Many people claim that they were introduced into the state, but it seems much more probable to me that they may always have been here in limited numbers. It would be a comparatively small matter for animals of such well known migratory propensities as the large squirrels to wander from Oregon up into this state.

These animals seem to be confined almost exclusively to what I call the prairie districts. This type of country was, a comparatively few years ago, undoubtedly almost devoid of any timber except the oak, but has been steadily encroached upon by the Douglas Fir. This resulted in the death of the oaks. The same process is going on today, another case of survival of the fittest, I presume. This type of country has little or no small undergrowth, such as the Sal-lal and ferns, and is peculiarly suited to the Gray Squirrels. The line where the prairie country meets the mountain country, with its dense undergrowth, is exceedingly abrupt, but none of this species of squirrel will be found over that line, unless by accident.

About ten years ago, I am uncertain of the exact date, the squirrels were given legal protection, the result being an immense increase in their numbers. Up to that time it seems probable that their destruction of the firs was little more than nominal, or I should almost certainly have noticed it. In a very short time, however, the results became most glaringly evident, until, at the time of this writing, hundreds of thousands of dollars worth of timber has probably been destroyed. In many large groves a low estimate would place two-thirds of the trees with the tops dead, or dying, making the destruction of the rest of the tree merely a matter of a short time.

So far as my observations have gone the Douglas Fir is the only tree attacked, this being confined to what is known as the second growth timber. The tree is girdled of its outer bark, the objective being the inner bark and soft wood just underneath. I know this to be a fact, because I have shot the squirrel at its work and found the stomach to be packed with the material above mentioned. Small trees are liable to be attacked close to the ground and girdled to the top, but trees of from twenty-five to a hundred feet in height usually have only the upper half injured. Girdling usually commences, I believe, about three-quarters way up the tree, the squirrels then working up and down. It is probable that they begin this work when the sap starts running in the spring, as I have never seen any signs of it before January at earliest, and it is almost altogether discontinued in June. Signs of their work at once become evident, as strips of bark about six inches long litter the ground in all directions.

SHOULD OUR CITY TREES BE LABELED?

BY ALBERT A. HANSEN

THE value of trees on our city streets has never been more fully emphasized than during the last decade. Due perhaps to this movement we now frequently hear of the city forester, a term which would have been quite foreign to us not many years ago.

The planting of trees on the city streets is now such an integral part of the "city beautiful" that the present time seems ripe for a closely allied movement which will tend, perhaps, to enhance the value of the plants, namely, a movement for the proper labeling of all the trees which now beautify our city highways and adorn the public squares and other places.

To the average street pedestrian a tree is just a tree; he gives little thought to the name of the plant because he knows well that reliable information on the subject is not readily to be obtained. All of us, however, are interested in plants, an interest which seems born within us. The average person is always desirous of calling things by their correct name, a feature characteristic especially of children. That the proper naming of plants does present a popular interest is fully attested to by the interested groups which so frequently congregate around the labels in such places as botanical gardens and parks where trees are thoroughly placarded. This fact was rather forcibly brought to the writer's attention during the past summer while spending an afternoon in one of the beautiful parks of Chicago where the trees were all named with artistic labels. The interest created was well shown by the number of people who paused to read the signs and then took a second glance at the specimen as though to more firmly fix its characteristics in mind. Walking through the capitol grounds in Washington while the linden was in fruit, the writer was amused to see a group of children gather several of the curious bracted fruits and carry them to a nearby policeman for identification! Such procedure, of course, would be rendered entirely unnecessary if the children's thirst for knowledge could have been satisfied by glancing at a label upon the trunk of the fruiting linden.

A RECOMMENDED TYPE OF TREE LABEL

This label bears the common name of the tree as well as its scientific name and native habitat and it is made of heavy zinc.

People enjoy labels; they always seem to attract the eye and interest the reader. Oftentimes there is the necessity of wasting a few minutes perhaps at the railroad station, or on the street corner while waiting for the car; time may fall upon our hands in a thousand different ways. Could these otherwise wasted moments be more profitably spent than in the study of the surrounding vegetation? This study may be aided greatly by the use of neat and attractive labels, and an interest be thus created which might prove an asset in the form of increased civic pride. The influence might be far-reaching; let us say, for instance, that a certain tree causes a particularly strong impression because of beauty of foliage, shape or any other of the many characters which constitute the beauty of trees. A desire may thus be created for the possession of similar trees for planting around the home or possibly along the neighborhood street. The desire can be more readily gratified if the label conveys the information by which more of the same kind may be obtained.

A knowledge of the names of plants is woefully lacking in city-dwellers, even among the well educated classes. We are reminded of the public school class of children no member of which could correctly name all five of such common plants as the buttercup, rose, goldenrod, columbine, and daisy! The proper labeling of plants would transform the city into a huge botanical garden; the resulting educational value would prove invaluable. A reasonable familiarity would also tend to arouse a desire to protect the plants and such sights as the mutilation of trees due to telegraph wires, the biting of horses and a dozen other causes, would perhaps be rendered rare because of the pressure of public opinion. The effect of reading a label upon an unknown tree is much the same as being introduced to a stranger; it gives one a feeling of kindly interest that increases as the new found friend is more frequently met, because it is human nature to take more interest in the things we know by name rather than by mere sight. Not the least attractive

feature of this idea is its comparative inexpensiveness. The value of a single city tree is variously estimated in sums ranging into the hundreds of dollars. Let us say that the average value of an urban tree is fifty dollars and the cost of the label is twenty-five cents. Is not the value of that tree increased far more than the fraction of its value represented by the financial investment in the label?

We hear much lately of university extension education. We learn of the extending of education into the shop, on the farm and to the factory. Here seems to be long-neglected opportunity for an inexpensive form of extension education which should touch the large masses of the people from the poorest to the wealthiest, for the streets are used by all. So far as the writer has been able to ascertain, not a single large city in America has adopted the idea of labeling its trees.

One day a year, Arbor Day, has now been set aside for the purpose of planting trees; why cannot this idea be further extended by increasing the value of the planted trees with appropriate labels? There are many localities where sufficient plantings have already been made; it is suggested that Arbor Day be celebrated in such places by labeling the trees which have already been planted and thereby materially increase their value to the community. A widespread public interest in trees will do much toward the proper planting of many of the frequently traveled rural highways whose beauties would be so greatly enhanced by the addition of bordering lanes of beautiful shade trees.

The labeling need not be restricted to trees; many cities and towns are richly provided with public squares and parks well planted with handsome shrubs. Surely the value of these plants will be greatly increased if labels bearing their names are placed upon their branches. Perhaps the best method of attempting such an undertaking is by means of municipal appropriations; and the actual work supervised by either the city forester, the park commission or any similar body whose duty it is to care for and protect the city's plants.

It is suggested that the data contained upon the label should include at least three things, namely, the common name, scientific name and place of nativity of the labeled plant. Such labels should be neat and durable; they may be either the expensive enameled kind or else a well-designed sheet zinc type.

As an inexpensive means of increasing civic pride and increasing popular knowledge concerning plants, the labeling of our city trees presents an apparently long-neglected opportunity which should soon be taken advantage of.

It has been said that he who plants a tree is greater than he who takes a city. Might this not be changed so as to include the one who labels a tree?

WINTER GREENERY

BY BESSIE L. PUTNAM

STRANGE how the majority of people take it for granted that there is nothing worth looking for in the woods in winter! Of course, if they only looked, they would find beautiful things in abundance, with plenty of woodland greenery when the snows permit it to be seen. And this applies out of the mountain districts where the laurel and rhododendron dominate; out of the zone of pines and hemlocks.

In the deciduous woods we shall have to look down to the ground perhaps, but in many places the Christmas fern is found in abundance, rivaling the Boston fern of the greenhouse in outline and verdure, if not in the length of the fronds. This species, *Aspidium achrostichoides,* thrives well in cultivation if given a partially shaded location, and is certainly a valuable acquisition.

The partridge berry, *Mitchella repens,* abounds in many places, its bright scarlet berries being most conspicuous unless the grouse has been ahead of you and captured them for dessert. Gray says that one may expect an albino in almost any form of vegetation, but expresses surprise as well as delight upon receipt of a white form of this berry. It seems almost unbelievable, and yet, we have white blackberries, despite the incongruity in nomenclature! A pleasing experiment is to place a few of the vines before the fire, where the heat will not quite burn them, and note how—as the air expands between the two layers of each leaf, they swell up like miniature puffballs. The most interesting feature in this berry is the two eyes, mark of its origin from a twin flower.

Several of the orchids present interesting phases of life, even in winter, the most noticeable being *Goodyera pubescens,* with its numerous rosettes of white-veined leaves hugging the ground. The network of veins with which they are covered would lead the uninitiated to insist that this can be no orchid, since it is in the class of parallel-veined plants. But a glance at the lower side of the leaf at once discloses the delusion.

Then there is the Putty-Root, *Aplectrum Hyemale,* with green and white leaves, glistening, and very much fresher in appearance than we shall ever see them again. Our foremothers found in the mucilagenous corms a satisfactory source for mending broken china, hence the popular name. The corms live two or three years, consequently that of last year is attached by a string ligament to the new bulb, and the name Adam and Eve is thus apparent.

Delicate ferns may still be found green in sheltered places, their fronds with a deeper coloring because of the moisture in air and ground. A stray dandelion, the flower of all seasons, may be looked for in open pastures during the winter thaw. With the February breaking of ice, the strudy Skunk Cabbage sends up its purplish caps, the odor as well as the color being suited to the carion loving fly. But do not pass it in contempt. It is not a vile plant, despite its odor; and the way in which the central spadix is covered with a mosaic floral design in creamy white is well worth closer examination.

THE TREE

THE MEMORIAL THAT LIVES

By CHARLES LATHROP PACK

President of the American Forestry Association

WASHINGTON, D. C.

PLANT a tree, that glorious sign of Nature to the world that life is ever renewing. Plant the "tree that looks at God all day and lifts its leafy arms to pray," and in the planting you will have erected the finest of all monuments—not alone to the hero of a war—not alone to mark a date—not alone as shelter for generations to come—but the finest of all monuments to yourself. In the planting of a tree you will leave behind a living sentinel that you gave to Nature that she might give back again in abundance to others who come after you. It is a great thing—the planting of a tree. Napoleon, in the heat and stress of a campaign, ordered that a military highway be turned aside that one of Nature's greatest wonders might be saved. The forests of France saved her and civilization in the World War. Much of the history of the world has been made beneath trees and much of it has been written because of trees.

THE PRINCE OF WALES PLANTING AN ENGLISH ELM IN CENTRAL PARK, NEW YORK CITY. CHARLES LATHROP PACK, PRESIDENT OF THE AMERICAN FORESTRY ASSOCIATION, AT THE RIGHT OF THE TREE.

With the signing of the Armistice the American Forestry Association proposed the memorial tree idea and it met with instant approval. Since then trees have been planted by individuals, schools, colleges, churches, patriotic organizations. These trees were planted not alone for the man who gave his life to his country, but to honor those who offered their lives. Memorials of many forms will be adopted, but each should be given the proper setting of memorial trees.

Tree planting has taken many phases. In some places hundreds of acres have been purchased by a municipality and memorial trees will be placed for every one in war service from a given county. Another phase is the "Roads of Remembrance" idea of the American Forestry Association. This is roadside tree planting. This has been taken up by women's clubs, automobile clubs and the motor industry. We are face to face with an opportunity, as a great road building program is planned by the states such as will not come to us again. With the "Roads of Remembrance" idea the people of this country have the chance to make the roads beautiful. Throughout the land, tree planting associations are being organized in the schools in co-operation with the American Forestry Association. It is easy to visualize what each school yard will mean to this generation of children because of this tree planting.

Memorial tree planting has been successful because trees, their planting and care, have always been a subject of great interest. To plant a tree is a commendable act. To give timely attention to trees after they have been planted is fully as praiseworthy as their planting. To refrain from removing trees from a place where they are unquestionably needed is another mark of the interest of a person in making the land a good place in which to live.

Now this matter of the planting and the care of trees can be readily promoted by anyone. There are a few fundamental principles underlying the various simple operations. But the entire affair is mostly a matter of

the exercise of common sense. Fortunately the majority of us can lay claim to a fair share of this quality. There are certain conditions which are met and known requirements of tree growth that are satisfied. By a little attention to the features of tree planting and care anyone may make a success of tree planting operations and, furthermore, may care intelligently for trees after they have been planted.

The Value of Planting Trees.

The value of planting trees is so apparent to our federal and state governments that there are planted on our public lands each year millions of tree seedlings and transplants. No less important and valuable is the planting of trees by individuals along streets, on country roadsides, in home grounds, on the public school lawn and in various other places where trees would add a touch of beauty and nature to otherwise treeless areas.

Providing shelter and shade is one of the chief values of tree planting. In these days of the scarcity and the high price of fuel for our homes and schools, trees are a welcome asset as windbreaks. A group of trees, located on the windward side of a building, act as a protection against the severe blasts of winter. Surely, no one can fail to remember the grateful shade of trees which has made the great heat of summer more bearable. The attractiveness of any place is increased by the presence of a few trees. These must be of appropriate varieties like the elm or the sycamore for low and fairly moist land or oak and pine for dry and sandy situations. Also their location with reference to the other features of the place and with reference to the use of the area must be suitable, otherwise their beauty will not be of the highest order. With a little care and consideration the proper kind of trees may be located on home grounds, streets, the school lawn or the park to enhance the attractiveness of these places.

LINDENS PLANTED ON THE INSIDE OF THE SIDEWALK TO AVOID THE OVERHEAD WIRES

It is widely known among scientists that trees tend to cool and to purify the air. Our public forests have been greatly used as health resorts because of the purity and health giving qualities of tree covered areas. But the effect of small groups of trees and even of individual trees in cooling and purifying the air is sufficient for us to plant them in few numbers for this special value.

The maintenance of bird-life is of utmost importance to the prosperity of our country. Without birds our agriculture would be impossible. And without trees to furnish nesting places the land would soon be destitute of the beneficial birds. Planting trees, therefore, is valuable in furnishing homes for birds.

The planting of trees awakens and instills an interest in nature. This interest is helpful to the enjoyment of our surroundings. Many persons have first had their personal touch with plant life and the work of nature through the planting of trees. This beginning has led to developments that have opened new fields of delight.

The value of trees in dollars and cents is one that is almost impossible to calculate accurately. It is universally accepted that trees add to the monetary value of property. Houses on a well shaded street will command more rent than the same type of structure on a treeless street. A home surrounded by dignified trees will invariably bring more money in the open market than the same house on a barren tract.

The Best Kind of Trees for Planting.

The first question that comes up when one is considering the planting of trees is what kind shall be selected. The answer to this depends upon a few factors which can easily be ascertained. One of the controlling factors is the character of the soil in which the tree must grow. There are a few trees, such as the American elm, that are adaptable to a wide range of soils. There are other trees, such as the tulip tree, which require a special condition of soil in which to thrive. In this case a deep, rich soil is essential. Then climate is to be considered. Anyone knows that a live oak grows best in the South and that the sugar maple does best in New England and the Northeast. It is safest to use the kind of trees that are already thriving in their growth in the neighborhood in which the proposed trees are to be planted.

Even with the general soil conditions and the matter of climatic requirements well satisfied, the special situation to be occupied by the tree should be considered. If there is small space which can be devoted to the future development of the tree it would not be satisfactory to plant one which will attain huge proportions. The location or situation of the tree may determine its selection as much as soil and climate.

More than any other determining feature in tree selection is the purpose for which the tree is planted or is to

serve. A spruce will be less successful for shade production than an elm, but the spruce is admirable for shelter. When a tree is part of the landscape scheme of a place it should be co-ordinated and fitted in with the other trees or additional objects in the surroundings.

Trees for city street planting may be of the same kind for a dozen blocks and must be evenly spaced. When trees are planted along a country roadside it is better to have them in groups of a few kinds and informally located.

There is another consideration that is often not given sufficient thought at the time of selecting trees for planting and that is the permanency of the kinds of trees. For this reason entire streets, sometimes a whole town, are planted with short-lived and otherwise inferior trees.

It is much more desirable to plant trees of considerable permanency such as oak and sycamore than to select quick growing, but also fast maturing, trees such as silver maple and many of the poplars.

The cultural requirements of some trees are less exacting than others. It is well to select those that will require no more attention than the planter is prepared to give them. Beyond the first two or three years after planting, the oaks, maples, elms and sycamores require very little cultural treatment.

RED OAKS ARE ADMIRABLE FOR STREET TREES BEING STURDY AND REQUIRING LITTLE ATTENTION

Obtaining the Stock.

In sections where the surrounding woodlands offer countless young evergreens and saplings at no more trouble than the digging, it has been customary for tree planters to go to nearby woodlots to obtain the stock for planting on streets, home grounds, school grounds and along country roadsides. This method has one special feature to commend its practice. It provides a variety of trees that are a product of the locality. But it is an improvement on this practice to buy from some nearby nurseryman the same variety of trees especially grown for the purpose of transplanting. In the nursery the trees are handled with the express purpose of preparing them for transplanting. This method of handling furnishes a tree that begins growth with less set-back than when the same size tree is taken directly from the woods.

There has been perfected special machinery for the transplanting of large trees from woodlands but this is quite aside from the ordinary tree planting. As a general rule a much larger size tree can be safely taken from a nursery for transplanting than from a woodland.

As to the size and shape of the tree to use in planting, to a great extent this will depend upon the kind of tree that is used and especially whether evergreen or deciduous. In general, nursery-grown evergreen trees up to five feet in height and deciduous trees of the same quality up to twelve feet in height are the best sizes to plant. In case of deciduous trees for lawns, either in groups or planted singly, there is not the demand for regularity and uniformity in shape as is required of trees for a street. In fact, it is preferable to have a group of trees, the individuals of which are not too regular in their shapes, for lawn or country road planting. For a street a tree which has its lowest branches trimmed away to twelve or fourteen feet from the ground after the tree has grown to a fair size is the desired shape. On a lawn the lower branches may be not more than four feet from the ground. In the case of evergreen trees the lowest branches should rarely be cut away.

Preparations for Planting.

After obtaining the trees certain preparations should be made for planting. Whether the tree is taken from a nearby woodland or is purchased from a nursery, its roots must be carefully protected both as regards severe drying and as to injury from scraping and bruises. When trees are shipped from a nursery their roots are covered with moist material. Keep this covering around the roots until immediately before planting. The roots of the trees dug from the woodland should be similarly covered and protected. The exposure of the uncovered roots of trees for five minutes may be sufficient to injure the tree beyond recovery. Care in protection of the roots from sun, dry air and wind will be amply rewarded in the performance of the trees after proper planting.

While some trees will undoubtedly grow in a poor soil after they have become established, there is no advantage in starting the trees in anything except the best garden soil. Usually that referred to as "top soil" is the kind to have on hand in sufficient quantity to plant the trees.

Unless the trees have been given better than ordinary handling in the operations of transplanting, their roots will need some trimming. The broken and badly bruised roots should be pruned with a clean cut. The top of the tree can be shaped up at this time. All of this operation of pruning should be made with a sharp pruner such as can be secured at any hardware store if it is

not already among the everyday tools of the planter.

In order to do the planting properly an equipment of tools in addition to the pruning shears is necessary. This equipment would properly consist of a spade for excavating the hole, a pointed stick such as a rake handle for

TREES, DECIDUOUS AND EVERGREEN, MAY BE GROUPED ON THE LAWN

filling the soil in around the branches of the roots, and a tamper to firm the earth. Where the ground is firm and hard a pick and a shovel may be added to the outfit. When the soil is very dry and the weather quite warm, it is well to have some receptacle such as a barrel, half filled with a mixture of water and earth, in which the roots of the tree may be puddled before placing in the excavation made recently for them.

Planting the Trees.

The two normal seasons for planting deciduous trees are spring and fall. The advocates for either season have many arguments to advance on the success of their operations; but as a rule it is safe to say that all trees except the evergreens may be planted at any time during the dormant period it is possible to work the soil, *i. e.*, when not frozen. This period begins with the dropping of the foliage in the autumn and ends when the buds burst open in the spring. The inexperienced planter will find the early spring the better for tree planting in the northern states. Evergreens are usually planted in late spring and during the latter part of August and the first part of September. If large balls of earth are secured intact around the roots, evergreens may be planted successfully at times earlier and later than the above seasons. The day to select, where this is possible, is a cool, cloudy one. On other days greater care must be devoted to the details of planting to prevent the drying out of the roots through the necessary handling of the plants.

The size and shape of the excavation for the individual trees should be large enough in width and length to receive the roots of the tree extended in their natural positions. The depth of the hole should be more than enough to receive the roots in the same manner. There should be space for a layer of six inches of good loam before the roots are placed in the hole. Then when the "top soil" is carefully worked among the fine roots the tree should be three inches lower than it was in its nursery or woodland situation. In working the soil around the roots no air spaces should be left when the tree is finally planted. In other words the soil should be firmly and carefully packed with the pointed stick and the tamper so that the tree can not be shaken from its position. A popular and excellent way to get the soil properly around and among the roots is to soak the soil in the excavation.

The spacing of trees is something that can not be governed by fixed rules. Street trees may be placed from thirty to eighty feet apart, depending upon the variety used. Catalpa and lombardy poplars, which are not very commendable for street use, may be planted at the minimum distance given above while sycamore and elm would require the maximum distance.

LOMBARDY POPLARS PLANTED BETWEEN MORE PERMANENT OAKS ARE ATTRACTIVE

For lawn planting in groups the trees may be placed as near each other as ten feet. For windbreak planting the individual trees are from four to six feet apart. For all purposes other than along streets it is better to plant

Register Your Memorial Trees In the National Honor Roll of the American Forestry Association.

the trees rather close with the idea of cutting out the crowding ones when it is necessary.

In the event that the top of the tree was not pruned before planting to correspond to the amount of root system, this should be done now. It is liable to be the case that too little pruning of the top is given rather than too much. In fact, many successful planters remove all of the side branches of a deciduous tree, leaving only the main shoot or leader at the time of planting. Above all, do not prune back or remove the leader of the deciduous tree. Evergreen trees need no top pruning at time of transplanting.

Care After Planting.

Regardless of how thoughtfully the trees have been selected and how thoroughly the planting has been done, there remains intelligent care to be bestowed upon the trees to have them live and thrive. Many planters have been disappointed with the results of their work because they considered their job completed when the last shovel of soil was placed around the tree. Trees in situations exposed to strong winds, and always along streets, should be staked with a strong pole reaching up to their first branches when the pole is driven into the soil two feet in depth. In addition to the stake, street trees need some sort of a guard. There are many types of guards on the market and examples of good types may be found in any progressive community. Trees planted in groups and where they receive natural protection will not need a stake to maintain them in an upright position.

THE WHITE PINE IS ONE OF THE BEST EVERGREENS FOR SHADE TREE PLANTING

THE SYCAMORE IS A MAGNIFICENT TREE FOR STREET PLANTING

In the middle west or other districts where there are hot winds during early summer the surface of smooth bark trees such as the linden or basswood will need protection of their trunks or main stems. This protection may be afforded by plastering with a thin coating of mud, winding burlap or other cloth, or by the use of tar paper. In almost any section of the country the soil around the base of newly planted trees will need some cultivation the first year or two during the drought season. If trees are planted in large groups ordinary cultivation may be given. When the trees are planted as specimens or are scattered, such as along the street, the digging of the soil in a circle around the tree to a depth of three or four inches will aid the tree in its growth.

THE SOIL MUST BE HELD INTACT WITH THE ROOTS IN TREE MOVING

In order to conserve the moisture in the soil around newly planted trees the ground may be mulched with leaves, straw, litter or a layer of dust formed by stirring and pulverizing the soil to a depth of an inch. This will obviate watering in most cases. Only under rare conditions will it be necessary to water or irrigate trees when mulching is practiced. Of course, this does not apply to the districts where all cultivated trees must be artificially watered by irrigation.

Is There a Famous Tree In Your Town? The American Forestry Association Wants To Know About It.

As trees grow they will need pruning. This requirement can be met by going over the trees during the summer when the amount of top to be removed can be more easily determined than in the winter months. The winter is a favorable time for pruning, however, and is devoted to this work by many city foresters and arborists. The matter of pruning is one which should be attended to annually. The amount of pruning is one of individual

THE AMERICAN FORESTRY ASSOCIATION'S TREE MARKER IN BRONZE

judgment but should be based on the shape of the tree desired to be produced.

Injuries to Trees.

There are a host of dangers to which trees are subjected in their struggle for existance. The injuries resulting from these dangers are not ordinarily so severe as to deter anyone in planting trees. Neither are the injuries so intricate that damaged trees should be left to their fate, which is a premature loss. Most injuries result from insect attack and tree diseases. There are other sources of injury such as electricity, gas and improper trimming of the tops to make room for overhead wires.

Insect Enemies.

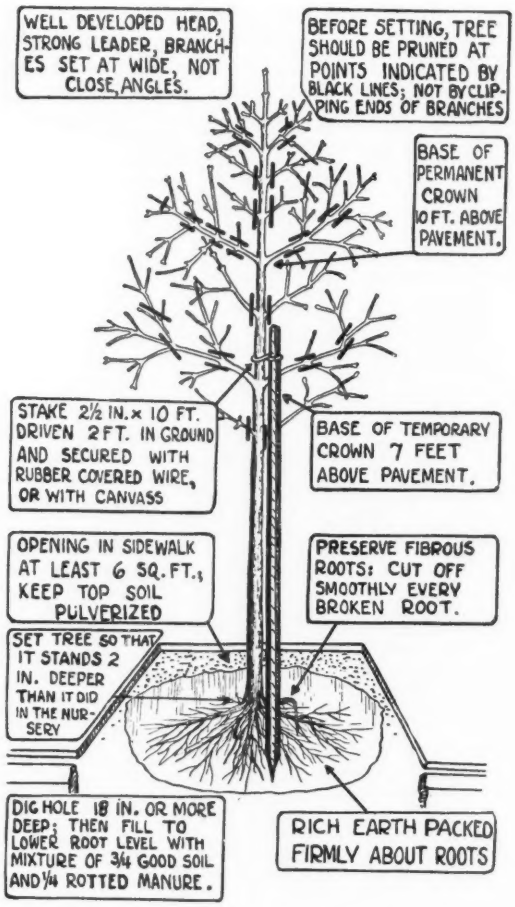
According to the habits of tree insect enemies, there are two common methods employed in combating them. Insects which feed on the leaves of trees, such as caterpillars, are successfully combated by the spraying of the foliage with solution of arsenate of lead during the period when the insects are feeding. This is in general the best method of holding in control this class of insects, although special means have to be employed for unusual cases.

The other general class of insects, such as plant lice and scales, which do not devour the foliage but suck the juices of the tree, have to be handled by a different method. The treatment for this class is the use of some contact poison which kills the insects it touches. Solutions of soap and kerosene are employed for this purpose.

A solution of arsenate of lead is made as follows: Arsenate of soda (50% strength), 4 ounces; acetate of lead, 11 ounces; water, 100 gallons. Dissolve the arsenate of soda in two quarts of water in a wooden pail, the acetate of lead in four quarts of water in another wooden pail. Mix these with the rest of the water.

For elm-leaf beetle use ten instead of one hundred gallons of water. In spraying many trees twice the strength, or one-half the water, of above formula will be better.

Prepared arsenates of lead are procurable on the market and where only a small amount of spraying is


WELL DEVELOPED HEAD, STRONG LEADER, BRANCHES SET AT WIDE, NOT CLOSE, ANGLES.
BEFORE SETTING, TREE SHOULD BE PRUNED AT POINTS INDICATED BY BLACK LINES; NOT BY CLIPPING ENDS OF BRANCHES
BASE OF PERMANENT CROWN 10 FT. ABOVE PAVEMENT.
STAKE 2½ IN. × 10 FT. DRIVEN 2 FT. IN GROUND AND SECURED WITH RUBBER COVERED WIRE, OR WITH CANVASS
BASE OF TEMPORARY CROWN 7 FEET ABOVE PAVEMENT.
OPENING IN SIDEWALK AT LEAST 6 SQ. FT., KEEP TOP SOIL PULVERIZED
PRESERVE FIBROUS ROOTS: CUT OFF SMOOTHLY EVERY BROKEN ROOT.
SET TREE SO THAT IT STANDS 2 IN. DEEPER THAN IT DID IN THE NURSERY
DIG HOLE 18 IN. OR MORE DEEP; THEN FILL TO LOWER ROOT LEVEL WITH MIXTURE OF ¾ GOOD SOIL AND ¼ ROTTED MANURE.
RICH EARTH PACKED FIRMLY ABOUT ROOTS

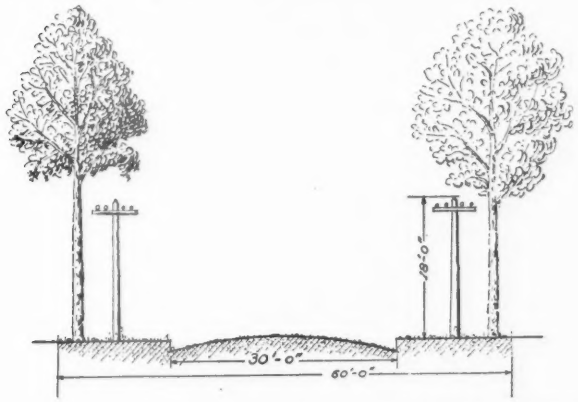
OBSERVE THESE INSTRUCTIONS IN PLANTING

to be done it is better to use these ready made materials.

Kerosene emulsion is made of hard soap, ½ pound; water, 1 gallon; kerosene, 2 gallons. Dissolve the soap in boiling water. *Remove from the fire* and add the kerosene while the solution is warm. Agitate, or churn with spray pump, until emulsion is creamy white. Use this as stock. For scale insects in the winter, spray with a 25-20% solution, *i. e.*, one part in 4 or 5 parts of water; in summer to control lice and for general use against scale insects apply a 10% solution, 1 part stock to 10

parts water. Do not use on muggy days or in wet weather.

There are on the market a number of good commercial mixtures. These should be used on shade trees according to directions which come on the containers. Lime-sulphuric wash is to be used only when trees are in dormant condition. In other words, do not spray when the foliage is developed on the trees.



HOW TO PLANT ROADSIDE TREES IN THE PUBLIC HIGHWAY WHERE IT IS NECESSARY TO HAVE TELEGRAPH OR TELEPHONE POLES

Three points in spraying are: (1) Be sure the spray material is properly made. (2) Apply thoroughly. (3) Apply at proper time.

The most common diseases of shade trees are known as fungi. They live upon the tissue of other plants, living or dead. Some of the fungi are microscopic in size, while others are larger, thread-like structures, with large fruiting bodies commonly known as mushrooms or toadstools.

The majority of fungus diseases are of little importance to shade tree growers. A few of the diseases are highly destructive. In the east the most destructive tree disease that can be mentioned is the chestnut blight. The white pine blister rust is another well known, though even more recent, forest tree disease.

The lime sulphur wash may be used as a fungicide in addition to its value for combating scales. The control of fungus diseases should be by preventative measures. This is given by covering all freshly made wounds on trees with a heavy lead paint and otherwise keeping the trees in healthy condition.

Telephone and electric light wires do some harm by being in contact with the branches of trees. This harm can be reduced by proper insulating of the wires. Where large quantities of wires are present they should be placed underground. Without question the greater damage to trees from overhead wires is an indirect one. This is caused by the wholesale cutting of the tops of trees to prevent them from touching the wires.

Illuminating gas has caused the death of many street trees on account of its poisoning of the soil. The only remedy is to replant. It may be necessary to remove the gas impregnated soil and replace with a fresh supply.

During the past fifteen years much attention has been given to the repair of injured trees through the methods of tree surgery. The principal operations that are performed in this repair work are antiseptical filling of decayed cavities, the bracing of weakened parts of trees and the correcting of natural deformities. In every region there are persons skilled in this practice who may be secured for the improvement of trees in this respect.

Selected List of Trees.

For New England States, New York, Pennsylvania, New Jersey, Ohio, West Virginia, Kentucky, Indiana, Michigan, Illinois, Missouri and Iowa:

Deciduous Trees.

Sugar maple	White ash	Pin oak
Norway maple	American white elm	American linden
Scarlet maple	Red oak	Scarlet oak
Green ash	White oak	

Evergreen Trees.

White spruce	White pine	Hemlock
Colorado blue spruce	Scotch pine	Arbor vitae
	Balsam pine	

For Delaware, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, Georgia, Tennessee, Florida, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma and Texas:

Tulip	Norway maple	Willow oak
Sycamore	Scarlet maple	White pine
Pin oak	Red elm	Longleaf pine
Scarlet oak	American white elm	Magnolia
White oak	Kentucky coffee tree	Live oak
Black oak	American linden	Cedar of Lebanon
Red oak	Red gum	American holly
White ash	Black gum	
Bald cypress	Hackberry	

For Wisconsin, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Colorado, Wyoming, Montana and Idaho:

Bur oak	Hackberry	Austrian pine
Linden	Honey locust	White pine
Norway maple	Black locust	Norway spruce
Green ash	Less desirable:	Colorado blue spruce
Wild cherry		White spruce
Larch	Cottonwood	Red cedar
American elm	Box elder	Arbor vitae
Black walnut	Scotch pine	

For New Mexico, Arizona, Utah and Nevada:

Hackberry	Bur oak	Box elder
Honey locust	Valley cottonwood	Arbor vitae
Green ash	Mountain cotton-	Deodar cedar
American elm	wood	Box
Black locust	Mountain ash	Euonymus

For California, Oregon and Washington:

Deciduous Trees.

COAST REGION

Large leaved maple	European linden	Sycamore
		Weeping willow

COLUMBIA BASIN

Norway maple	Sycamore	Russian poplar
European linden	Green ash	White willow
	Silver poplar	

Evergreens.

Deodar cedar	Monterey cypress	Lawson cypress
Monterey pine		Bigtree

The Tree—The Memorial That Lives

Tree planting is not a thing of this year or of the next. Indeed it will be well to plant the memorial tree every year. The people are just awakening to the possibilities of tree planting. The trees are monuments with a meaning for they live gloriously just as did those for whom they are planted. The glory is the thing to tell, to the world. Our sorrow is a private, personal affair and needs no telling to the world in bronze or stone. Instead let us plant trees to tell of their glory, for that is the way they who went forth to the great adventure would have it.

And if we do not plant trees as memorials let us plant them for shade, for scenic value, to beautify streets or lawns, for parks, and for communal woodlands. All serve a purpose.

Plant the tree with an appropriate ceremony. The character of the ceremony depends upon the character of the planting. If single trees or groups of memorial trees are planted the program given below will be of service. If roadside planting is done by a community or an organization a public meeting to inaugurate the work should be held and a program of appropriate addresses made. If shade trees in garden or street are planted, of course, no program is necessary but there should always be some kind of formal ceremony when a school, a club, an organization or a community participates in a planting.

TREE PLANTING PROGRAM

THE PLANTING SONG

Tune: America

God save these trees we plant,
And to all nature grant
Sunshine and rain.
Let not their branches fade,
Save them from ax and spade,
Save them for joy and shade—
Guarding the plain.

When they are ripe to fall,
Neighbored by trees as tall,
Shape them for good.
Shape them to bench and stool,
Shape them to square and rule,
Shape them for home and school,
God bless the wood.

Lord of the earth and sea,
Prosper our planted trees,
Save with Thy might,
Save us from indolence,
Waste and improvidence,
And in Thy excellence,
Lead us aright.

Address—Upon Occasion for the Planting

RECITATION—"TREES"

Poem by Joyce Kilmer, Who Gave his Life in France

I think that I shall never see
A poem lovely as a tree.

A tree whose hungry mouth is prest
Against the earth's sweet flowing breast.

A tree that looks at God all day
And lifts her leafy arms to pray.

A tree that may in summer wear
A nest of robins in her hair.

Upon whose bosom snow has lain;
Who intimately lives with rain.

Poems are made by fools like me,
But only God can make a tree.

Planting of the Tree or Trees

WHAT THE TREES TEACH US

Fourteen Rhymes for Individual Recitations

I am taught by the Oak to be rugged and strong
In defense of the right, in defiance of wrong.

I have learned from the Maple, that beauty to win
The love of all hearts, must have sweetness within.

The Beech, with its branches wide-spreading and low,
Awakes in my heart hospitality's glow.

The Pine tells of constancy. In its sweet voice,
It whispers of hope till sad mortals rejoice.

The nut-bearing trees teach that 'neath manners gruff
May be found as "sweet kernels" as in their caskets rough.

The Birch, in its wrappings of silvery gray,
Shows that beauty needs not to make gorgeous display.

The Ash, having fibres tenacious and strong,
Teaches me firm resistance, to battle with wrong.

The Aspen tells me with its quivering leaves,
To be gentle to every sad creature that grieves.

The Elm teaches me to be pliant yet true;
Though bowed by rude winds, it still rises anew.

The Lombardy Poplars point upward in praise,
My voice to kind Heaven they teach me to raise.

I am taught generosity, boundless and free,
By showers of fruit from the dear Apple tree.

The Cherry tree blushing with fruit crimson red,
Tells of God's free abundance that all may be fed.

In the beautiful Linden, so fair to the sight,
This truth I discern: It is inwardly white

The firm-rooted Cedars, like sentries of old,
Show that virtues deep-rooted may also be gold.

—Helen O. Hoyt.

Address—Dedication of the Tree or Trees

TREE PLANTING SONG

Tune: America

Joy for the sturdy trees,
Fanned by each fragrant breeze,
Lovely they stand!
The song birds o'er them trill,
They shade each tinkling rill,
They crown each swelling hill,
Lowly or grand.

Plant them by stream and way,
Plant where the children play
And toilers rest;
In every verdant vale,
On every sunny swale—
Whether to grow or fail,
God knows best.

Select the strong, the fair,
Plant them with earnest care,
No toil is vain.
Plant in a fitter place,
Where, like a lovely face,
Let in some sweeter grace,
Change may prove gain.

God will His blessing send,
All things on Him depend,
His loving care
Clings to each leaf and flower
Like ivy to its tower.
His presence and His power
Are everywhere.

—S. F. Smith.

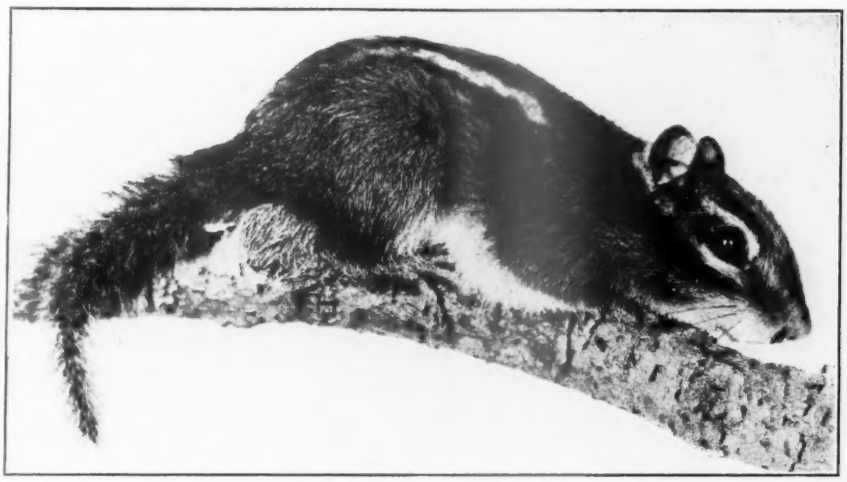
Every tree lover should be a member of the American Forestry Association. Write to the office, Maryland Building, Washington, D. C., for particulars.

FOUR-FOOTED FORESTERS—THE SQUIRRELS

BY DR. R. W. SHUFELDT, C. M. Z. S.

THERE is no region, country, or continent on the globe that can in any way rival North America for the great number of squirrels, both species and subspecies, represented in her fauna. In so far as brilliancy of color and size are concerned, however, the handsomest and largest squirrels in the world are found in various countries of the Orient and the East Indies. For instance, along the coast of Malabar is found a squirrel as big as an ordinary cat; this animal is bright red on the upper part of its body, offset by the most intense black, while all the lower parts are of a clear yellow.

The largest squirrels found in the United States are the fox squirrels, and some of these are also called cat squirrels; not that any of them look like a fox or a cat—the terms probably have reference to the color of some of the species in the first instance, and in the second to the matter of size. The largest arboreal squirrel in the United States is the fox squirrel of the northeastern section of the country, an animal now becoming extremely rare in the districts where it used to be very abundant. Like all fox squirrels, it is subject to great variation in color; and some people might think they had several species before them were they to see a lot of them together, selected with the view of exemplifying these color phases. Unlike the gray, the fox squirrel hoards up little or no food for the winter months, and this seems to be a season he does not especially relish. In fact, in very cold weather with deep snow, he will roll himself up in some warm hollow of a tree and there partly hibernate. Should a warm spell come along, many of the fox squirrels will shake off their stupor, descend to the ground, there to stretch about under the hardwood trees where the snow has disappeared to a greater or less extent, to find hickory nuts, chestnuts, beech mast, and so on; if it chances that spring is drawing near, they may find some swelling buds to fill out the list.



COMMON EASTERN CHIPMUNK

Fig. 1. A young male which was a pet of the author's for more than a year, but it never became very gentle. Usually the tail of this and allied species is much more bushy and handsome.

During the late spring and summer months, these big, lazy squirrels fare much better; there are plenty of berries and wild fruit, and there is nothing they enjoy more than the ears of luscious, sweet corn, ripening early in the fields of the farmer. In the estimation of the fox squirrels, this is far and away ahead of all the seeds of pine cones, or acorns and nuts they ever tasted. They think mushrooms not bad though, and will eat them when they find them.

It is rarely the case that any of the larger hawks or owls capture a squirrel of this species; they are usually pretty cautious, and, being big and strong, they can take very good care of themselves. For all that, it is likely that a Great Horned Owl or a Snowy Owl could manage one all right, especially the former, as the writer has often seen it hunting through the woods in the day time. And, as the fox squirrel is a late riser, and never makes a practice of being out of his hole at night, he is also, to some extent, free from the attacks of the racoon, wildcats, and gray foxes. Nevertheless, these animals are his enemies and destroyers; they undoubtedly capture and devour many a fox squirrel, especially throughout the South or such parts of it where cats, foxes, and 'coons are plenty. However, they have more to dread from the shot-gun and wicked modern rifle of the hunter, who comes to a tree where he notices the scattered scales of the cones underneath—a sure sign that a fox squirrel is up there, biting them off to get at the seeds. It *may* be some other species, but it is more likely a fox squirrel, and the hunter will surely scout around that tree till he gets him.

In the South, instead of living in the hollow trees, the fox squirrels build big nests in the tops of the pine and other trees—usually of Spanish moss; in these they sleep, also carrying to them the pine cones just mentioned. In the hardwood forests of the North, dry leaves take the place of the Spanish moss, and a conspicuous nest is built with an entrance hole at the side. Sometimes these leaves turn a brilliant yellow, and then they attract the attention of any one who is an observer of such things in the woods. Many people relish the fox squirrel as

food, while others do not fancy it in the least. A Florida cracker, however, will stand guard over a tree with his rifle or gun for half a day, if he thinks he is going to get a shot at a fox squirrel. As game, there are few things he likes better; and it is difficult for him to find language to express himself if, after a long wait, he shoots his squirrel, and the latter, merely wounded, comes bumping down through the tree, catching his hind or fore feet in a long festoon of Spanish moss, spins around like a top while it holds him as though he were tied by a strong piece of hemp twine. There he hangs—perhaps where it is impossible to reach him, or where a score of rifle balls will not cut him loose.

These squirrels, as well as other species, are, during the summer months, infested by a larva that gives them no end of trouble and discomfort.

When surprised in the woods, the behavior of the fox squirrel is quite different from that of the gray species. As a rule the former will put forth his best endeavor to reach some hollow in a tree, and into this he quickly scrambles to avoid his enemy. One may often see them stretched out on a limb as flat as possible, and they will, thinking themselves unperceived, remain a long time in that position as quiet as a mouse. If cornered by there being no hole handy for him to get into, and the limb he is on is too small to hide him, he will begin barking at the hunter or his dog in the most defiant manner possible. It is said that a fox squirrel can beat off a small dog, and will put up a hard fight if one attacks him. The female has her litter in the nest, wherever this may be, and the young are born in April in the North and month earlier in the South.

THE GRAY SQUIRREL

Fig. 2. All are more or less familiar with the species here shown; it is a fine specimen of the Gray Squirrel, in the attitude it assumes when feeding. (From life by Mr. George Kingsley, Maquoketa, Iowa.)

The habits of the several species and subspecies of fox squirrels of the North, West, and South are much the same, differing only as the animals are affected by their environment and the influence of climate. The southern species are more active than their sluggish relatives of the North, and this they show in their general build and appearance.

The fox squirrels are frequently kept as pets in large cages; they are usually gentle, but not as interesting as many other pets of the kind. Sometimes we see them in wire cages in zoological parks; but they are not often seen at liberty in the open parks of cities, places where the gray squirrel is now so abundant. (Figure 2.) In nearly all the large, wooded parks in and about New York City, and even well out into the suburban districts, the latter species is very abundant. In such localities they thrive marvelously well; and, as the law prevents their being in any way molested, they become particularly tame and sociable. It is no unusual thing to see, early in the morning, some old gentleman, or a lady with children, all being fond of squirrels, in some nook or pathway of a large city park, feeding the squirrels with nuts they have brought for them. Some of the little gray fellows, less timid than others, will scramble up on one's clothing and hunt in the pockets, or run out on one's hand and arm to secure the nuts they are so fond of, and of which they so often really stand in need, as the trees fail to provide sufficient for the consumption of the many that live in the place. Such localities afford abundant opportunities to study the habits of this species, as they behave practically as they do in their native wilds. Their nests of leaves are often seen in the trees, and every hollow limb or trunk is utilized by a pair for a home in which to rear their young and store away provisions for the winter. Stone and Cram have truly said in their "American Animals," that the gray squirrels "are comfort-loving animals, and away in the silent forest a gray squirrel must be forever on the alert to guard his hidden stores against the thieving red squirrels and the wild mice of the woods, and always listening for the rustle of a fox's footstep on the leaves, or the distant screaming of a hawk. For the red-shouldered hawks are dangerous enemies, and the hours they habitually choose to spend in hunting, correspond exactly with the squirrel's working hours—from sunrise to ten o'clock in the morning, and from three in the afternoon until near sunset. They watch, cat-like, for an opportunity to take some unhappy squirrel unawares, or, circling high above the tree-tops, their keen eyes penetrate the foliage from constantly varying positions, searching branch and hole and the carpet of fallen leaves beneath, till, perceiving the flicker of a curly tail, the long wings close of a sudden, fan-like, and the hunter goes down with a rush to match his quickness against that of the squirrel. Or the still more treacherous goshawk or Cooper's hawk, with their narrower wings and slender, yacht-like build, shoot along with baffling swiftness through the undergrowth, just to surprise the busy harvesters at their work.

"The gray squirrels also know that the men found in the woods in the fall, unlike the town variety, carry guns

and feed on squirrels to a certain extent. With very little encouragement they will soon learn to pay you frequent visits in your room, if you will only leave a window open for them within jumping distance of their treetop, a few nuts or a piece of cake quickly overcoming their shyness; in fact, they often prove to be something of a nuisance about the house. Even in places where they are looked upon as legitimate game, they lose much of their fear of man during the closed season of spring and summer."

There are many instances on record of a number of squirrels occupying the same hollow in a tree; in fact, when surprised in the woods, as many as five may be seen to scamper for the same hole in some big hickory or oak, every one of them getting into it in a hurry. Whether it is a pair and their nearly full-grown young ones it is often difficult to tell, as the latter, at that time of the year, are very similar in size and color to their parents.

LIKE A SQUIRREL'S TEETH

Fig. 3. Skull of a Coypu that died in the National "Zoo" at Washington, several years ago. Note its enormous incisor teeth. These last, described in the text, are an exaggeration of what we find in all squirrels.

So numerous were the gray squirrels in the years gone by, that in some States premiums had to be offered to assist in exterminating them, or at least greatly reducing their numbers. For instance, as long ago as 1749 they much annoyed the people of western Pennsylvania; the government offered three pence a head for them, and through this means no fewer than 640,000 were destroyed.

Of late years there seems to be no record of a migration of gray squirrels; but fifty or sixty years ago—and doubtless later—such things were not uncommon. They usually occurred in the West, and were truly remarkable phenomena to behold. Thousands upon thousands of these animals would congregate—a great, rolling, gray sea of animal life—supplied by all the forest regions for miles around. In spite of their strong love for the forests where they were born and grew up, and their dread of water, they would commence moving off to some other region. Away they went, over farms and prairies and through the forests, consuming everything in their way that could possibly be eaten, until some river or stream interrupted their onward course. It mattered little then how wide or how deep this river was—cross it they must in their intense impulse to migrate. The Ohio has been the scene of many such crossings. Upon arriving at its bank, those leading the mass would run up and down and swarm into neighboring trees; but finally, in spite of being, perhaps, among the most indifferent swimmers in the animal world, pressed from behind by the legion of their advancing companions they take to water. They rather wriggle than swim, with only their noses out of water. Hundreds of their number drown, and their lifeless bodies, massed together, float down the stream. The sight is most extraordinary, and can only be compared with the migration of the lemmings, so familiar to those who know anything of the life-history of those animals.

As the gray squirrels reach the other side of the river—or rather such of them as do—they are almost completely exhausted, and hardly able to drag themselves upon the bank. They are fortunate, indeed, if dozens of men and boys have not gotten wind of their coming, and on hand to meet them with clubs and sticks, to dispatch them as fast as they land.

It is difficult to ascertain the cause or causes responsible for bringing about one of these migrations. Possibly it is an impulse to seek new regions where food is more plentiful, it having become nearly exhausted in the country they leave by common consent. The explanation may lie deeper than this, and such migrations date back to a time in geologic history, when other and entirely different causes brought them about, the descendants doing nothing more than their early ancestors were compelled to do, the common instinct still being persistent.

In various parts of the country a coal black squirrel is met with; it is but a melanistic variety of the gray, and it is now becoming quite rare. They are about the same size as the gray squirrel and have similar habits; indeed, in old times and perhaps still in some regions, the "blacks" and the "grays" are found inhabiting the same stretches of timber, and even living in the same trees.

A CHIPMUNK

Fig. 4. There are a great number of species and subspecies of Chipmunks in the United States, and here we have one of the southwestern forms. Their habits and food vary according to their several habitats.

When alarmed by the approach of a hunter, or a dog, or a hawk sailing overhead, the gray squirrel has a habit of giving vent to a peculiar little bark or whine which may be heard for a considerable distance. Apparently he does this in order to put such of his kind as are within hearing on their guard against the danger that threatens them. When wounded, especially if they stick in the tree where shot, they will utter a shrill little squeal, not altogether unlike a big rat caught in a steel trap.

Squirrels are the prettiest and most interesting animals found in the whole realm of nature. The person who fails to admire them anywhere, and especially in their native woods, and who does not love them with all their pretty ways, graceful forms, and cunning tricks, must surely have something radically wrong with him somewhere.

Mr. C. L. Holmes, of Waterbury, Connecticut, has called attention to the following facts in regard to the hybridization of the red and gray squirrels: "In 1874 or '75, like most boys of twelve or thirteen, I was very fond of pets, and spent quite a little of my time trapping squirrels, both red and gray, which were very abundant around my father's house. One day I found, in an old-fashioned spring-door wire rat-trap, a squirrel which my father and we boys declared must be a cross between the red and the gray. It was about half way between the two in size, and had a red tail and a gray body; white underneath, and a red stripe between the back and the belly. Its head was shaped like a red squirrel's, and had a little red on it. It was the most active animal for its size I ever saw, and it was with considerable difficulty that I finally got it from the trap into a wire bar cage, which I had used for several years to hold both red and gray squirrels. I put the cage in the conservatory, and we were standing around admiring him, when he gnawed off some solder, pushed the wire down, and was out of the open window like a flash. It was a great disappointment for a boy I assure you. I believe then, and always shall believe that I had secured a rare prize."

If this were in fact a hybrid squirrel, produced by a crossing between a red and a gray one, it would indeed be quite remarkable, as the two species are, as a rule, by no means friendly, and never seem to get along well together. One may see more than a dozen white or albino gray squirrels in a lifetime, and several albino red ones; but there is nothing remarkable in that, any more than cases of albinism in other animals, as elephants, mice, woodchucks, robins, woodcocks, and scores of other forms—men and women included.

In these days it seems that nearly as many people

BLACK SQUIRREL

Fig. 5. One of the most elegant squirrels we have is the big Black Squirrel of Florida; its face and ears are gray, as is a part of the body and tail. It is a close relative of our gray squirrel, but much larger and not so gentle.

go into the woods to hunt squirrels with a camera as with a rifle or shotgun; and in many ways this practice is significant. Humanity is to be congratulated if we are coming to think less of giving pain, destroying life, and rendering creatures miserable—committing animal murder in fact—than of giving pleasure, recognizing the rights of others to live, and furthering the ends of happiness.

Sometimes, when in the tops of the high trees, springing from bough to bough, even the most agile of squirrels, either red or gray ones, will occasionally miss their footing, and fall down through the tree until they come in contact with some of the limbs or twigs below. To one of these they dextrously cling, instantly continuing their reckless course along the branches of the trees, leaping from the ends of one onto the terminal sprays of another, with a daring that but few of the arboreal animals can equal. Once, in a piece of hickory timber, with a few scattered chestnut trees growing on a hillside not far from the Zoological Park at Washington, D. C., when the buds were just beginning to swell, and the trees were tall and scraggly, with scraps of upcurled bark on the trunks and branches of the hickory trees, a fine, old red squirrel was seen scampering over the ground and ascending the first tree he came to. There being two persons present to observe his subsequent behavior, he evidently became somewhat suspicious, running out on the end of one of the highest branches, and making a leap into the next tree. Being up so high, he was not very much frightened, and so he passed from treetop to treetop with all the fearlessness of an old hand at it. His observers were watching him closely; and when in the top of a very tall shellbark hickory, some

PRAIRIE MARMOTS

Fig. 7. Among the more or less nearly related forms of our squirrels are the Prairie Marmots of the western plains, erroneously called "Prairie Dogs,"—so named from the "bark" they have, which latter has a sound not unlike the bark of some of our larger species of squirrels.

fifty feet from where they stood, a tree at least 140 feet or more high, he ran out, as usual, along one of the uppermost limbs, and in doing so ran over a piece of lightly attached shellbark, about the size of one's hand. His weight was sufficient to have it instantly part company with the tree; and before he could regain his balance, or catch onto anything else, both fell together, it being a sheer drop of something less than 150 feet. Down he came, belly downward, with out-stretched tail, convulsively clutching the air with all four of his little paws, without touching another single twig in his fall. He struck the hard ground with a thud that could be heard for a considerable distance, and bounced up over a foot in the air. One would expect, of course, and with very good reason, that he would be completely knocked out by the shock; but no! The little chap gave one big gasp for breath, gathered himself together, and in less than five seconds he was off again and up another tree in less time than it takes to tell it. This was the tree he was making for when he fell, and when he reached the middle of it, in he popped into a hole, and that was the last seen of him. Had a man been a victim of a similar fall, he would have been killed for a

BLACK SQUIRREL EATING

Fig. 6. Here we have the same animal shown in Fig. 5. above; it is eating a part of a nut, and the curious angulated pose it assumes when so engaged is remarkably well exhibited in this cut.

certainty, and the chances are that half the bones in his body would have been broken in the bargain.

Some time ago a rather remarkable discussion was being carried on in some of the popular scientific periodicals of the country as to when the squirrels drink, or whether these little animals ever drink any water. In these days this appears to be a most extraordinary inquiry to make—one might as well start a similar interrogation in regard to any other abundant and well known animal, domestic cats, for example. Squirrels drink whenever they are thirsty, and when they meet with water sufficiently pure, they quench their thirst. They will lap it off the leaves after a rain, or take it where it gathers in the hollows of the trees, or in depressions found on the tops of rocks with broken surfaces, from pools or the brinks of streams, or indeed anywhere it is convenient. Those species kept as pets drink water regularly and suffer when they do not get it. They drink very rapidly, plunging their muzzles well into the fluid. Sometimes it may be noticed that after drinking, the red squirrel is attacked by a peculiar fit of something akin to coughing, accompanied by a kind of wheezing and sneezing, as though some of the water had been snuffed up into the nostrils, or gotten into the air passages.

RED SQUIRREL

Fig. 8. This little Red Squirrel or "Chickaree" was captured in Virginia many years ago; it is an excellent portrait of the eastern form of the species, and it is here given in another pose in Fig. 9.

An exceptionally fine species of American squirrel is the black one of Florida, which is a splendid animal and carries a fine, bushy tail. His coat is nearly black, set off by the light gray muzzle and ears. He is a nobly put-up form, full of vigor and vivacity, and extremely graceful in all his actions and motions. When reared from the young, he makes quite as interesting a pet as the gray squirrel does, and exhibits just as much affection for his owner.

Abert's squirrel is a species fairly abundant in the high pines which occur upon the mountain sides, principally to the northward and eastward of Fort Wingate, New Mexico, and they have frequently been taken within a mile of the station. A good hunter once stated that he had shot nine of them, all within five miles of this locality, and only hunted a few hours each day. There is also a splendid black phase of this species of squirrel; and very dark gray ones also occur, which are really handsome animals, as the white part in them are generally purer, and the specimens improve by the contrast in the colors.

Mr. H. W. Henshaw, who many years ago was connected with Hayden's Survey, and who has collected the California gray squirrel, once pointed out that that species is even a handsomer animal than Abert's; but it is hard to believe that anything in the shape of a squirrel could surpass an Abert's in its spirited aspect, its grace and beauty; then, too, it is one of our largest varieties, which also adds to its otherwise fine appearance. This animal is essentially a tree lover, and rarely spends any length of time upon the ground. If suddenly surprised in the forest, it immediately seeks the nearest and largest pine tree within its reach by a series of very active jumps and skips; ascends with great rapidity to the first branches, where it often stops to take a look at the intruder, thereby affording the gunner a capital opportunity to bag the specimen.

The Arizona squirrel is a somewhat larger species, and quite different in habits. Unlike Abert's, it is rather partial to the crests and sidewalls of the canyons of the country where found, and is very much of a ground squirrel, rarely resorting to the trees when surprised by the hunter. As a matter of fact, they are but rarely observed in a tree. This squirrel always rears its young in a hole dug in the side of a clay bank or similar locality. All the squirrels are more or less carnivorous in their habits, and will eat raw meat with avidity. It is stated on good authority that the red squirrels will pillage birds' nests and devour either the eggs or the callow young.

Counting the true squirrels, the flying squirrels, and the chipmunks or ground squirreis, we probably have upwards of sixty different kinds of these little animals in America; to appreciate what a formidable list they make, one should consult such a publication as the "List of North American Land Mammals in the United States National Museum, 1919," compiled by Dr. Gerrit S. Miller, Jr., curator of the Division of Mammals in that institution. Probably other species have been added to the catalogue

since it appeared. As it stands, we find in it over 40 different kinds of chipmunks enumerated as occurring within the boundary lines of the United States. This includes species and subspecies, and does not take into consideration those which are extralimital or confined to Mexico or Canada, as the case may be.

A good deal has been written about chipmunks, and they are fully worthy of all the biographies that have appeared about them (Fig. 1). In various works they are not only known by this name but referred to as hackees, or ground-hackees, striped squirrels, striped ground squirrels, and ground squirrels. All are small mammals of marked intelligence, and if properly reared and treated make very affectionate pets. In them the cheek pouches are highly developed, each consisting of a hairlined pouch, occupying quite a space on either side of the mouth, with the opening to the front. One of these pouches will hold several large nuts, and it is a remarkable sight to see one of these little fellows making off to its burrow on a run with a big butternut in each cheek. It suggests a little animal with a head three times too big for its body. Some rodents have these pouches more to the outside, where their openings may be clearly discerned, as is the case with the gopher rats.

ATTENTION !

Fig. 9. This is the Red Squirrell in the attitude of attention; and squirrels, as a rule, have many different poses, each being characteristic of them and very distinct, as the feeding pose, when "barking," when burying a nut, sunning itself, and others.

Another interesting structure in the squirrel family is that of the *incisor teeth*. There are two of these in either jaw—a pair above and a pair below. They may best be studied in the skull of any large rodent, as a beaver, a jack-rabbit, or a muskrat. The skull selected here is that of a South American Coypu. This animal died in the National Zoological Park a few years ago, and the skull was presented to the writer. (Figure 3.) Note the two large upper and lower incisors; these, by grinding upon each other, keep the four cutting edges as sharp as razors. In the case of nut-eating mammals like our squirrels, this is extremely essential. These incisor teeth keep continually growing, as they are worn off during the life of the individual—the upper pair downwards and the lower pair upwards. Curiously enough, they sometimes cause the death of their owner; for, should any blow, given in the mouth, turn either of the upper pair to one side or the other, so that the edges are not continually worn off evenly and regularly by the lower incisors, the misplaced tooth or teeth—the upper ones—will continue to grow in a curve, backwards, until their sharp edges come in contact with the roof of the mouth. In that part of the squirrel's skull the bone is quite thin and not strong enough to stop the advance of the tooth. The result is that it not only, in due course, pierces the palate, but grows backwards into the brain, eventually causing the death of their hapless owner. A similar misfortune has been noted in the case of rabbits.

Chipmunks have another use for their cheek pouches. When they construct their most ingenious burrows, they use them to carry away the loose dirt resulting from their digging, to hide it so it will never be suspected where it came from. They are also careful not to wear a path leading to the entrance of their burrows, for it would be a guide to their retreat for some of their numerous enemies.

In places where chipmunks are abundant, they are found to be extremely sociable little animals among themselves, playing together, until the approach of the coldest weather of the year, when they hibernate as do so many other small mammals occurring in the higher latitudes of our country.

One of our earliest writers on the chipmunk has said that "In the autumn this creature may be seen around the fields of Indian corn, and in the walnut and chestnut woods, filling his ample cheek pouches, and carrying off his store to his granaries. His hole is generally placed near the roots of trees, or in a decayed stump, or among a heap of rocks, or in a bank of earth, and usually near the forests or fields from which he draws his supplies. Sometimes his retreat has two or three openings; it usually descends almost perpendicularly at first; then it rises with one or two windings, and at last, at the distance of eight or ten feet, terminates in a chamber lined with

leaves, amid which the animal sleeps. Three or four occupy the place together. There are several side-galleries, where the stores of wheat, buckwheat, hazel-nuts, acorns, Indian corn, grass-seeds, walnuts or chestnuts, according to the productions of the locality, are deposited. They are excedingly provident, continuing to add to their supplies till forced into their houses by the inclemency of the weather. Often their stores are much beyond the necessities of the winter. The squirrels hibernate in their retreats and become somewhat sluggish, but do not approach the unconscious torpidity of the marmot. The young, four or five at a birth, are produced in the spring, and beautiful little creatures they are when first led forth by their mother.

"The chipping-squirrel rarely climbs trees, unless to escape pursuit, or perhaps occasionally to get at some desired fruit. It has a chip, often changed into a gurgling sound, when it escapes into a hole or conceals itself amid the recesses of a stone wall—seeming, in fact, to be a sort of scoffing laugh at the impertinence of the assailant. On other occasions its chip becomes a sort of song, in which several squirrels in different parts of the forest seem to answer one another, and thus to fill the woods with a kind of merry chorus. Though not familiar, and seldom or never becoming reconciled to confinement, preserving always a rather sullen appearance, still this little creature is a general favorite. His voice is associated with the woods and bright spring and autumn mornings, and especially with those happy days of youth, when every wood-ramble was an adventure, and even a chip-squirrel was game."

FLYING SQUIRREL

Fig. 10. The little Flying Squirrel makes an interesting pet, although he is not very active until after nightfall, or when handled by some one.

In the wilder and unsettled parts of the country where chipmunks abound in the forests, they have their enemies by the score, and these quite apart from man; for they are constantly preyed upon by hawks, minks, weasels, lynxes and wildcats, and occasionally by foxes. As to weasels, they have been known to chase a chipmunk into its burrow, when the latter has been made of good size, capturing and killing its owner in his very bed-chamber.

In some sections of the country our flying squirrels are very abundant; but as a rule their presence is only known to those who are familiar with their habits. (Figure 10.) This for the reason that they are nocturnal by habit, and but rarely seen during the daytime. Indeed, the sun seems to affect their eyes and cause them no small amount of inconvenience. They nest in the hollows of big trees, where their young, from one to half a dozen, are brought forth. They may be easily raised; and, be it known, they are far more agreeable pets than the chipmunks. Where these animals are very numerous in the forests, the only time they may be advantageously studied is some time after dark, on a moonlit night. To watch them in their gambols is the sight of a lifetime. One should select some spot of vantage in the woods where the trees are large and situated well apart, and the undergrowth practically absent. Watch that old male who is making his way to the top of a tall tree as fast as he can go. Once in the uppermost twigs, he selects a place where he can quit a branch conveniently, when he spreads out his legs lateralwise, which extends the skin-flaps on either side. He at once launches into the air, in the direction of another tree, which may be at a distance of fifty yards or more away. But our little animated parachute has calculated all this, and at first he scales downwards for two-thirds the distance, then more rapidly and abruptly upwards, landing safe and flat against the trunk of the tree he made for, and at once makes for the top of it as though his life depended upon his getting there. He then goes through a similar performance back to the trunk of the tree from whence he started. This he will do over and over again, and dozens of others of his kind will be performing in a similar manner in the near neighborhood. The observer can easily imagine that the air is alive with small shingles, sailing in curves from tree to tree, in all directions. Surely a very remarkable sight.

Squirrels have more or less near kin among other rodents, especially those that dig and live in burrows underground. Among these last we have the so-called "prairie-dogs," which are really marmots. (Figure 7.) These make capital little pets, as the writer can vouch for, having kept them on several occasions. The story that they live in their burrows happily associated with burrowing owls and rattlesnakes is a tale long ago exploded. These little animals are, to a very considerable degree, omnivorous by habit; for they will, when moderately hungry, devour with apparent relish such things as pie-crust, raw oysters, and fish.

BIRDS AND TREES IN WINTER

BY A. A. ALLEN, PH. D., CORNELL UNIVERSITY

GRAY skies, white hills, and cold winds are not conducive to thoughts of bird life. We look for beauty now in ice crystals on the windows, purple shadows on the snow, and dark branches silhouetted against the sky. Life is dormant and the little creatures that still eke out their existence with us seem not a part of the winter. While we marvel at the rich greenery of the pine, and the lacy network of the elm twigs, and the sturdy growth of the orchard trees, we forget that even during their winter sleep, their insidious foes are either

A DOWNY WOODPECKER AT WORK

Nature provides the woodpeckers to combat the borers. It is our duty to see that the woodpeckers are encouraged to remain with us in good numbers. Note the hole made by this fellow when he got the borer.

at work beneath their bark or are safely ensconced in its crevices awaiting the coming of spring to continue their deadly work of destroying the foliage. The boring larvae of the pine weevil and leopard moth are secure from all man-made destructive agencies deep down in the tissues; the tiny eggs from which thousands of tent caterpillars and canker worms will hatch are safe behind a thick coating of varnish, and the larvae of the codling moth have hidden themselves behind the loose flakes of bark of the apple trees. It is little wonder that they pass unnoticed and unthought of. Summer comes and the tops of the young pines shrivel and grow brown, the elm branches drop their leaves and die, the foliage of our shade trees becomes ragged and hundreds of little caterpillars hang down on silken threads or spin tents among the branches, and long before harvest, the apples fall to the ground and are wasted. Now, we say, is the time we need the birds.

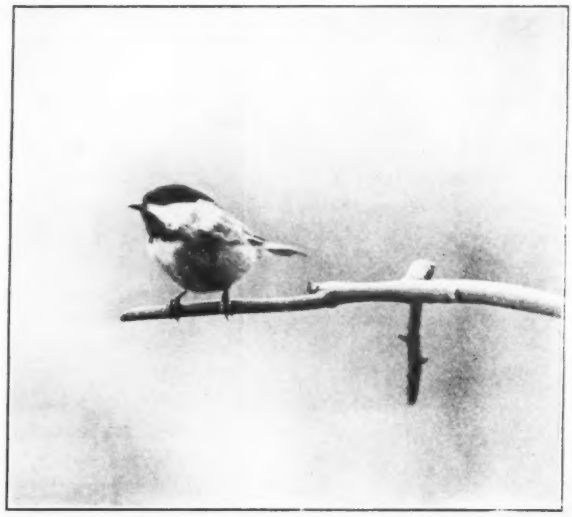
But let us examine some of the young pines whose tops are still green. There beneath the terminal whorl of branches are two or three little round holes. Perhaps they are now filled with gum, for they were made last winter. They were made by a downy woodpecker to get the weevil larvae beneath the bark. If we examine the elms we find that it is the city trees that have suffered most from the leopard moth, trees that have not been visited by the woodpeckers. It is the same with the other shade trees but wherever a troop of nuthatches and chickadees and brown creepers have spent the winter climbing about the trunk of the trees, examining all of the crevices in the bark, and scrutinizing all of the branches, the leaves still retain their freshness and caterpillars are few. The little packets of eggs that would have given rise to thousands of caterpillars formed lunches for these winter birds. In the orchard irrregular holes through the loose flakes of bark attest their usefulness again for they tell of their inroads upon the hibernating codling moths. Summer is not the only time for birds. If we had more of them during the winter we would not need so many

THE DOWNIES LARGER COUSIN

This is the hairy woodpecker, and every dollar spent for suet or sunflower seed to attract the winter birds is a dollar well invested.

in the summer. Every effort, therefore, should be made to increase the number of winter birds.

Former numbers of AMERICAN FORESTRY have given directions for attracting the winter birds by maintaining feeding stations for them throughout the fall and winter. One should feel that every dollar spent for suet or sunflower seed is a dollar well invested, for thus a whole company of beneficial birds can be kept in our service. Far better than any spray for combating the codling moth we are told in the best manuals on fruit growing, is the fastening of suet in the trees to attract the winter birds. The same is true for many other pests



CHICKADEES CLEAN THE BRANCHES OF INSECT EGGS

These little fellows are a valuable addition to every woodlot.

of orchards and shade trees, and in forests we must, of course, depend entirely upon the birds and the other natural enemies of insects, for spraying is impossible.

Let us consider for a moment why birds are much more effective in controlling certain pests than any other means. Take the codling moth as an example, the worst pest of the orchard and one that destroys over a million dollars worth of apples every year. The little brownish moth lays its eggs on the newly formed apples shortly after the petals fall. The egg hatches and the larvae immediately begins to dig down into the fruit. If the spray has been put on at just the right time and has been put on evenly and has not been washed off, so that the larvae gets it in biting through the skin at its first meal, the larvae is killed and the apple is saved. If, on the other hand, the poison does not happen to be on the right spot at the right time, the larvae continues its way to the center of the apple and is safe from all enemies. The apple falls to the ground, the larvae matures and leaves the apple and crawls up the trunk of the tree. It then hides under a loose flake of bark where it spins a cocoon about itself and prepares to spend the winter. The next spring it transforms into the little moth that goes about, laying its numerous eggs on the newly forming fruit. During its entire life cycle, therefore, there are but a few hours when the poison spray is effective against it and, inasmuch as all of the eggs do not hatch at exactly the same time, it is obvious that the chances of killing all of the larvae are very slight. With birds as the destroying agents, however, there are two periods when the codling moth can be controlled and each one is of considerable duration. First, when the moths transform in the spring and the warblers and vireos and other migrating birds are passing through the orchards, and second, during the entire winter when the nuthatches, and woodpeckers, and creepers are scrutinizing the trunks of the trees for any possible insects that may be in hiding. It is little wonder, therefore, that the birds form a better method of control.

WOODPECKERS DESTROY BARK BEETLES

A useful downy woodpecker at work.

A WINTER CREEPER

The Brown creeper searches the bark of trees for insect eggs and hibernating insects.

Another familiar pest is the tent caterpillar which is very destructive to all fruit trees. The reddish brown moth lays its eggs in the form of incomplete belts on the smaller branches, each belt or packet consisting of hundreds of tiny eggs glued together and covered with a varnish-like substance. These eggs hatch early in the spring when the leaves are just beginning to unfurl and the young caterpillars make their way to the nearest fork where they spin a little tent of silk to protect them. They work out from this tent, feeding on the leaves and adding to the tent as they need more room. If there are many colonies working on a tree they soon strip it of all its

leaves. When the caterpillars are full grown they crawl to some convenient shelter and spin cocoons about themselves and later transform into the brownish moths. The moths then begin a new cycle, laying the packets of eggs, in which stage the insect passes the winter.

The tent caterpillar is much more easily controlled than the codling moth in the orchard but nevertheless from time to time is exceedingly destructive. In many communities men have been hired to pick the egg masses and later the cocoons from the trees and to burn the tents. Competitions among school children have been inaugurated resulting in the gathering of thousands of the egg masses, but all of these efforts have been spasmodic and have died out as spontaneously as they have arisen. The eyes of children working at odd moments in the spirit

WINTER BIRDS CONTROL THE CODLING MOTH

Here are some species of bark with holes punched through them by a woodpecker to get the hibernating larvae concealed beneath. The empty cocoons can be discerned in the top row showing the undersurface of the bark.

of competition over the branches which they can reach from the ground cannot compare with the keen eyes of the birds, working at all times over all parts of the trees and working for the very maintenance of life. The little caterpillars when first hatched furnish food for the warblers and vireos and wrens and other small birds on their northward migrations; the half grown caterpillars with their hairy covering are snatched from their tents by the orioles; and the full grown caterpillars cannot be too hairy or too juicy for the cuckoos that relish them more than any other insects. But it is not only by the summer birds that the tent caterpillars are destroyed. Hundreds of embryo caterpillars are destroyed at a single swallow by the nuthatches and chickadees hunting about the branches during winter and even the crows have been known to eat the little varnished packets of eggs.

These are but two of the hosts of insect pests that can be controlled by man but that are much more satis-

ANOTHER BARK CLEANER

The white-breasted nuthatch, with us throughout the year and a most useful bird. Here he is in a characteristic pose.

factorily controlled by birds when they are sufficiently abundant. There is an equally long list of pests that are either uncontrollable by man or that are controlled only by the greatest effort and expense, but that the birds are constantly though unwittingly fighting. There are, for example, the many kinds of destructive borers. It is often impossible to know whether borers are working in a tree until its vitality has been sapped if it is not killed outright. Nature knows this and she has provided the woodpeckers to combat them. She has given them pincer-like feet for clinging to the bark and stiffened tails to support them in their search about the trunk. She has given them chisel-like bills for hacking open the burrows and long barbed tongues for pulling out the larvae from their retreats. Nature has gone this far. It is our duty to see that the woodpeckers are encouraged to remain with us in good numbers. They must have an occasional dead tree in which to nest and to roost and they must have a little extra food during the winter in case their natural food is scarce. So when we are observing upon the winter landscape, marveling at the grace of the wind-swept branches and making our plans for bigger and better forests, and for more shade trees along our highways, let us not forget the winter birds. Let us include refuges, and feeding stations and sanctuaries for birds among the much needed civic improvements and let us call no forest preserve complete without its offering for the birds that are to help protect it.

EDITORS INDORSE CAMPAIGN OF FORESTRY

WITH the Anthony Bill, looking to cutting the size of newspapers up before Congress along with an investigation of the reasons for a news print shortage, more newspapers of the country are falling in line with the American Forestry Association in its campaign for a national forest policy. The editors all agree that the drive of the Association for memorial tree planting and for "Roads of Remembrance" will bring to the attention of thousands, who could be reached in no other way, the value of tree planting and what forests mean to the economic life of the country. We quote from the *Omaha Bee:*

"One of the plans *The Bee* has often urged on the people of Nebraska which will yet come to be adopted, looks to the afforestration of a great expanse of waste lands in the sandhill district. The idea back of this finds expression in the proposal of Charles Lathrop Pack, head of the American Forestry Association, that a national move in the direction be set on foot as an appropriate memorial to Theodore Roosevelt.

"No president felt the impulse more than he, nor did any understand so well the benefits to come from the proper administration of such a policy. Grover Cleveland gave life and vigor to a land policy that Roosevelt brought to its ultimate service, yet it was the strenuous one who could vision an America denuded of its wonderful timber growth. His conservation ideas did not get the encouragement they should; the public was not then responsive to the appeal, but some progress has been made. Under his successors more definite efforts have been put forth to save a portion of the natural wealth of the country for its people, but these have not as yet taken satisfactory form.

"The Pack suggestion does not lay so much stress on conservation as it does on reproduction. It will not prevent the reasonable use of forests standing, but looks to their systematic replacement by replanting. Valuable timber may be brought from seedlings within a generation; the marvelous firs and pines of the northwest, the giant oaks and hickories, the walnuts and the elms of the Mississippi Valley and the other wonders of the forests now gone, or fast going, can not be restored in less than centuries.

"But the Maryland and Virginia peninsulas show what may be done within a lifetime. What has happened there can be duplicated in Nebraska, in Wisconsin, Minnesota, and other places throughout the land. The future demand for timber may not be equal to that of today; it certainly will not be so satisfied, but the present generation can well endow the future inhabitants of the land by taking steps to give them something in the way of standing timber."

The *Philadelphia Inquirer,* the *Trenton Times* and the *Houston Post* are among the other papers that have commented editorially on the possibilities of making a national forest policy the great tribute to Theodore Roosevelt. In the *Biddeford, Maine, Journal,* we find the editor expressing this view:

"Recalling Theodore Roosevelt's love for nature, President Charles Lathrop Pack, of the American Forestry Association, urges the planting of trees in all parts of the country as memorials at this time of general commemoration of his birthday.

"In a broader aspect, this Association has begun a campaign for the planting of memorial trees and the creation of "Roads of Remembrance" as a simple and effective way of bringing the great principles of reforestation before the public mind and keeping it there. It is pointed out that to interest the people in trees is the first step in the process of establishing such automatic recognition of the value and need of a specific national forest policy as shall be effective to save wide areas of country from climatic calamity, create much wealth in timberland and avoid the fires which now all too frequently cause such heavy loss.

"It is believed that this idea of planting trees on a large scale as memorials of distinguished men is an excellent one, as it has an appeal which will be of general service to all the people while at the same time carrying a romantic tradition of enduring strength in the national character. It is argued that the forests are like a bank account, in that they cannot be continually drawn upon unless deposits are made occasionally. The need of a national forest policy admits of no argument on the negative side; it is not a project for the benefit solely of any particular individual or class, such as the lumberman, the paper-maker, the wood-worker, but for all the people.

"To say nothing of the rapidly growing demands for home consumption, the demands from all parts of the civilized world upon the United States for lumber and forest by-products in this ante-war period will be greater than ever before. Consequently, every practical consideration is on the side of a vigorous and intelligent conservation of our natural resources. Among those resources the forests are particularly important, not only from the material standpoint of dollars and cents, but from the no less practical standpoint of the protection and conservation of the physical and spiritual health of the general public. The planting of memorial trees affords the opportunity for creating headway for a campaign of interest in and practice of the science of reforestation. So far as it goes it is an admirable means to a desirable end. The planting of the suggested "Roads of Remembrance" may be the next step in the movement to the end that there may be created a public sentiment favorable to the reforestation of large areas that have been denuded by the forest butchers. The forest owners are slowly learning their lesson. When that has been learned they will realize that it is not good policy to harvest one crop and leave the area in such shape that another crop cannot be secured for fifty or seventy-five years, but that the better way is to cut only the more mature timber and leave the smaller growth for a later cutting. Thus successive crops, at least two or three in a generation, may be secured in such a manner that the tract will be left in as good condition as when operations were first begun."

The *Baltimore News* reviews the figures in the *Wall Street Journal* and calls them "a note of warning." Further on the *News* says:

"Our foreign lumber trade amounts to about 3,500,000,000 feet a year; and this year the demands of European reconstruction will call for an even greater amount.

YE SCRIBE PRACTISES WHAT HE PREACHES

(Burton (Wash.) News.

The American Forestry Association urges that we plant trees in memory of our boys who gave their lives for the world's freedom. Trees that will shade and adorn the highway are especially desired. Ye scribe hereby pledges one broad-leaved maple and one dogwood along the front fence, as soon as the rains start in earnest.

EDUCATION BY THE ASSOCIATION

'Whatever part of this the United States supplies,' says the *Wall Street Journal*, 'will be at the expense of the future;' and it goes on to point out that Britain is planning to plant nearly 2,000,000 acres of forest land, and that France, Norway and Sweden are preparing restrictions to prevent cutting in excess of the annual growth. It urges the public 'to insist upon appropriate legal measures to keep cutting within the limits of annual growth and to extend reproduction.'"

The *Rochester Democrat and Chronicle* calls attention to the figures set forth by the *Forest Patrolman*, which says that forest fires are costing the West five or six million dollars every year.

Following are other editorial opinions:

Colonel Roosevelt was a lover of all that pertained to the great out-of-doors. This being true there can be no more suitable tribute paid to the former President's memory than the planting of trees and the preservation of forests. Forests are among the greatest national resources. Forests are like banks, as Mr. Pack told the foresters, lumbermen and wood users generally at the Indianapolis meeting, you must deposit them if you want to take anything out. Then, in addition to the material benefits to be derived from the restoration and conservation of forests, the planting of memorial trees is one of the greatest forces for Americanization and keeping aflame the community spirit, born of the war.—*Trenton, New Jersey, Times.*

Illinois is a tree-growing state. As such it is interested in the work of the American Forestry Association and that interest should be encouraged. The association is carrying on a campaign designed to bring about a general forestry policy. In the meantime, each individual can do something to help out in the matter of replacing American timber. No bit of land should be permitted to go to waste, simply because it is not suitable for the raising of grain crops or for gardening purposes. It will grow trees.—*Springfield, Illinois, Journal.*

The *Sentinel* has called attention before to the imperative need of a broader and more definite forest policy in this country. We have contrasted conditions in America in that respect with those prevailing in foreign countries, the comparison being decidedly unfavorable to the United States.

A broader policy on the part of the nation and of individual states is needed not only because of the demands of the wood pulp industry, naturally of much interest to newspapers, but for other reasons as well. *The Manufacturers' Record*, in the current issue, gives some of these reasons as follows:

"Failure of this country to adopt a national forest policy in past years is responsible in large part for the unpleasant situation which the lumber industry finds itself in today, according to Charles L. Pack, president of the American Forestry Association, in keeping with other commodities lumber has advanced greatly in price due largely to increased demands for war needs."

The matter is one of immediate importance. It cannot be deferred indefinitely. Something should be done, and done now. —*Winston-Salem, North Carolina, Sentinel.*

Charles Lathrop Pack, president of the American Forestry Association and during the war the guiding spirit of the National War Garden Commission, is out in a new campaign before the American people. He has a gospel of four words and he is preaching it mightily and unceasingly: "Let there be trees."

Mr. Pack recognizes the manner in which trees enter into our every-day life. To him, as he would put it before the people, the tree is a friend, a companion, a defender and a comforter.

Mr. Pack has launched a drive for the planting of trees. He would have every person in the nation become responsible for the planting of at least one tree. His program includes planting memorial lanes in honor of dead soldiers, community parks with each tree named in respect of a departed or wounded hero; reforestation of cut-over areas; orchards on the roadsides, and so forth.

We might suggest a slight addition to this ambitious plan. Let every person in the nation become responsible for two trees, one of the long-lived hard-wood types, which will exist in some suitable locality for many a year after the planter is gone, and the other of the food type, such as apples, plums, peaches or other fruits in other sections of the country, or a nut-bearer, each of which will add to the food supplies of the world and help cut down living costs for the coming generation.

But even if the tree planted is of neither of these kinds, but purely ornamental, it will have its value and it ought to be planted.

Let there be trees.—*Pontiac, Michigan, Press.*

That is a praiseworthy project of the American Forestry Association which seeks to have memorial trees planted and "Roads of Remembrance" created as a means of reforestation. The association is spreading the idea throughout America and pointing out that when it interests the people of the country in trees it has brought to their attention something that is likely to advance far a national forest policy which will mean a great deal to the country in the years to come.

In a country in which already the scarcity of timber is keenly felt and where the woodlots on the farms have practically become a thing of the past as any considerable factor it is time that some such policy were adopted. If we promote an abundance of trees for no other reason than soil protection and to perform service in the matter of moisture storage we have done a very great deal.

Something must be done to replace these forests, if not in a mass tract along the highways. No more appealing suggestion has been made than that just advanced by the Forestry Association. In a comparatively short time the trees would reach maturity.

Wouldn't it be pleasurable today to ride for miles along a country road lined with trees and realize that those trees were set out in the late '60s as memorials to those men who fell in the Civil War?—*Watertown, New York, Times.*

The American Forestry Association has issued an appeal to every school in the country to plant a tree this fall. It will send free tree planting instruction, and suggest an interesting program for a tree-planting observance. Tree planted school house grounds will serve several ends. Children will take pride in their school when thus adorned, and different classes will emulate each other to see which can do the most in beautifying it. If every school house could be made a center of pretty landscape gardening, the idea would spread from the children to the homes. —*Staten Island Advance.*

The seriousness of the forestry situation in this country is being brought to the attention of the people by the American Forestry Association and there is hope that their work will have the effect of awakening a genuine interest in saving and recouping our timber interests.—*Florida Times-Union.*

The American Forestry Association has issued an appeal to every school in the country to plant a tree. It is a suggestion that might well be taken up in New Haven, where most school grounds are barren of grass or shade. Most recess playgrounds are paved with brick and no more desolate places are to be found anywhere.—*New Haven, Connecticut, Union.*

THE EXTENSION OF FORESTRY PRACTICE

BY HENRY S. GRAVES, UNITED STATES FORESTER

THE year covered by the report of the Forest Service for the last fiscal year was signalized by a new movement for extending the practice of forestry. More than 20 years ago the Division of Forestry offered to give advice and assistance to private timber owners who might wish to consider applying forest management. The offer received a remarkable response and formed a real turning point in the forestry movement. For the first time forestry in the United States became something which a business man could grasp and weigh on its merits as a definite business proposal. This aided powerfully in bringing the whole question of forestry, public as well as private, before the country. But it did not result in any widespread acceptance of the practice of forestry by timberland owners.

The failure of this early movement to get private forests extensively under management was, however, not immediate. The Division of Forestry made its offer of cooperation early in the fiscal year 1898. By the close of the fiscal year 1905 requests had been received for the examination of private holdings, large and small, comprising all told more than 10,900,000 acres of land. Many requests were from lumber companies and other owners of extensive timber tracts. On the strength of the showing made by the preliminary examinations, a number of these large owners entered into cooperative agreements for the preparation of working plans. The interest of the lumbermen was much increased by the fact that the young foresters were able to show them that they were losing money by certain wasteful practices. Closer utilization spread rapidly through the industry. Public interest in forestry and an intelligent idea of what it meant became general. In the early years of the present century it really looked as though the management of forests as permanent productive properties might be voluntarily undertaken by private owners on a very large scale. Although many obstacles were presented by the internal conditions of the lumber industry, progressive lumbermen were giving much serious attention to the possibility of engaging in the practice of forestry. The chief stimulus was furnished by the rising value of stumpage.

The panic of 1907 radically changed the situation. The lumber industry entered a period of protracted depression. From that time on private forestry made relatively little progress in the United States, except on farm woodlands. While public forestry has made vast strides, the forests of the country that are in private hands are being depleted with very great rapidity, and almost everywhere without effort to renew them. A grave situation is becoming manifest in various ways. This is why the Forest Service is now putting forth a new and energetic effort to call public attention to the facts and to propose a program that will afford relief.

The problem presented is one that can be solved only by public action. The general practice of forestry on privately owned lands in the United States will not take place through unstimulated private initiative.

The magnitude of the National Forest enterprise and the prominence given to its accomplishments have given the impression to some that the problem of forestry is under way of solution. In point of fact, this is by no means the case, for the National Forests represent in area only about a quarter of the forest area of the country and less than that proportion of the actual standing timber. Private owners therefore hold more than three-fourths of the present timber supplies of the United States. The amount of material which is actually placed on the market from the National Forests amounts to only about 3 per cent of the entire consumption of the country. The rest comes from private lands. While the proportion will be altered, the country must still look to private lands for a large part of its forest supplies.

The rate of depletion of our forest resources is more than twice, probably three times, what is actually being produced by growth in a form which will be servicable for products other than firewood. High prices of lumber are not wholly due to the increased cost of labor and materials. A part is due to the ever-retreating sources of timber supply. Already the supplies of all our eastern great centers of production are approaching exhaustion with the exception of the South, and even there most of the mills have not over 10 to 15 years' supply left of virgin timber. Already the southern pine is being withdrawn from many points as a competitive factor and its place taken by western timbers, with consequent freight charges which the consumer must pay. Communities needing to build roads and other public works which involve increased taxation are often having brought sharply to their attention the economic consequences of stripping off the forests and leaving in their stead unproductive wastes of low taxable value now or in the future. These facts are recalling public attention to the effects of uneconomic and wasteful exploitation of our forests in the past and to the need of steps which will put a stop to the destructive processes and replace them with methods which will build up rather than injure the country.

The situation necessitates a broad policy of forestry for the whole Nation which will include both an enlarged program of public acquisition of forests by the Government, the States, and municipalities and protection and perpetuation of forest growths on all privately owned lands which may not better be used for agriculture and settlement.

The proposed plan for realizing these objectives contemplates cooperation between the Federal Government and the States. The Government and the States must

join hands in working out a program that will bring into correlation the various public and private efforts for the protection and right handling of forests. The function of the Federal Government, in addition to handling the National Forests, would be to stimulate, guide, and coordinate State action and conduct necessary investigations regarding the best methods of forestry, to assist the states in classification of land, and to harmonize action as between the different States. The States would also have a function in handling public property owned by them, and they would have a further direct responsibility in connection with the protection and perpetuation of private forest lands.

In the matter of private forestry the Government would work primarily through State agencies. To initiate the proposed policy there should be a Federal law authorizing the Government to cooperate with the States in bringing about the protection and right handling of forest lands within their borders, and providing means for such cooperation.

The net result of the steps already taken to inaugurate and organize the new movement for forestry has been to attract renewed and widespread attention to the fact that a real forest problem must be reckoned with, and is of national concern; to establish a conviction in the minds of many who have first-hand knowledge of the facts that definite action to protect the public interests involved and safeguard a resource essential for economic and industrial stability is now required; and to secure what is believed to be a feasible program, of a character to command general acceptance as it becomes fully understood.

NEW YORK'S FORESTRY PROGRAM

A COMPREHENSIVE program of forestry development for New York State has been outlined by Conservation Commissioner George D. Pratt and presented to the Governor and members of the State Legislature for consideration.

Commisoner Pratt says:

"Investigations made during the war by this Commission, in co-operation with the United States Forest Service, for the purpose of locating available supplies of timber to meet the urgent demands of the Army, developed a situation so serious in New York State that it threatens the absolute existence of some of the most important industries within our borders—those that depend for their continuance upon unfailing supplies of forest products. The menace of a wood shortage, which these investigations disclosed, is imminent, and the need for immediate administrative steps to replenish our supply is great. The measures which I suggest for relief constitute a unified plan to meet the paramount necessity for a proper protection and development of the forest lands of the State, and have already in their fundamental features been thoroughly developed and tested by the work of the Conservation Commission in the two greatest forest regions of the State. They accordingly involve an extension to the State at large of the system of forest protection and development now practiced in the Adirondacks and Catskills, with trained foresters in each section, and a further intensification of forestry methods in every section, including the Adirondacks and Catskills.

"The shortage of nearly all kinds of wood material, with which we are faced, affects other states as well as New York, and has arrested the attention of foresters throughout the country, so much so, in fact, that Colonel Henry S. Graves, Chief of the United States Forest Service, has instituted a national movement for more rational use of this waning resource, and for effective steps to insure the growing of successive timber crops hereafter. In no state, however, is the situation more critical than in New York. This is due to the fact that New York is the greatest user of wood of any state, the total annual consumption amounting to over 1,750,000,000 board feet of lumber, in addition to 1,000,000 cords of pulp wood, over 130,000 cords for wood alcohol and other products of distillation, and enormous quantities of other material for railroad ties, cooperage, poles, and fuel wood. It has been estimated that the annual lumber bill of the state is over sixty million dollars, about two-thirds of which goes outside of the state. In spite of the fact that approximately two-thirds of the annual lumber needs are met by importation, it is nevertheless true that we are actually cutting within the state from three to five times more timber than is grown here each year. Statistics of forest products for 1918, which is the last year for which they have been compiled, show that in that year we cut 762,289,934 board feet, in addition to 18,651,346 miscellaneous pieces, like posts, poles, laths, shingles, etc.

"Our forests are thus rapidly vanishing, and it requires little more than arithmetical computation to determine the time when timber production in New York State will be a negligible industry, with the inevitable result that the vital manufacturing establishments which depend upon available supplies of wood will migrate to other fields. I submit that the remedy for this situation is one of the most fundamentally important problems with which we have to deal in New York State today.

"With a proper administration of the land best adapted for timber production, New York State should eventually be able to supply a large part, if not all, of its timber needs. The present forest area of the state is about 12,000,000 acres. This is approximately 40 per cent of the entire area of the state. In addition there is a large acreage which now lies abandoned, but which is well adapted to and can be used for forestry purposes. A future permanent supply of standing timber as a raw material for our industries is a problem of conservation of present resources and of right administration of this vast area. It is a problem of practical economic importance which we can under no circumstances afford to

overlook. We cannot stop the cutting of timber, because we need the material, but we must take steps to insure a better utilization of what we have, and a future replacement.

"For purposes of administration, I suggest the division of the state into ten forestry areas. Each of these areas should be placed under the supervison of an experienced forester, acting under the direction of the Division of Lands and Forests of the Conservation Commission in the same way that district forest rangers in the Forest Preserve counties now administer their forest areas. With this organization, the work to be accomplished would be as follows:

"1. *Forest Protection.*—This is fundamental in all forest work, and is absolutely indispensable if investments in forest property are to be safeguarded. Experience in the Adirondack and Catskill sections has demonstrated that this protection can be secured by the proper organization of a fire fighting machine. The forester in each of the districts of the state would effect such an organization.

"The protection of forested areas from the ravages of disease and insects should be an important function of the forester. For the last three years the Conservation Commission has been engaged in the detection and eradication of white pine blister rust in the state at large, as well as in the Forest Preserve counties, and has carried on a systematic study for the permanent control of this disease, in co-operation with the United States Department of Agriculture. As a result of eradication work and studies, it has been decided that white pine, which is the most valuable timber crop of the entire state, can be successfully grown in the future if proper administrative steps are taken to protect it from the blister rust. The division of the state into ten districts, with a forester in each, will provide the machinery for making this protection effective. The forester will also be able to give much advice and assistance to private land owners regarding the protection of their forest crops from other diseases and from insect attacks.

"2. *Forest Survey.*—The timber needs of the war strongly emphasized our great lack of information regarding forestry resources, and indicated clearly the need for a careful survey of such resources, as one of the first steps in a comprehensive plan for forest development. An inventory of forestry resources should be made in order that adequate information may be available for working out the details of a proper plan of management of forest lands. Besides the inventory of standing timber resources, a comprehensive soil survey of the state should be made, for the purpose of determining the lands fit for agriculture, and those that should be used for permanent forestry purposes.

"3. *Reforesting.*—There are two types of forest land in this state: One has some sort of forest cover, and the other has practically none. Reforesting of the non-forested area is vital to the welfare of the state. The forest is a crop. This is a truth which we have failed to realize while we have exploited with a lavish hand the free gift of nature accumulated through the vast unmeasured past. Already the Commission is operating six state nurseries, from which each year between eight and ten million trees are distributed for reforestation of denuded land. At the present time between four and five million of these trees are being planted upon state owned land of the Forest Preserve, while the remaining four or five million are distributed free of charge to state institutions and at cost of production to private land owners throughout the state. The plan for forest development accordingly contemplates a further development of this system, with enlargement of the state nurseries, and with increased attention on the part of the foresters to the planting of the trees. This work of wide-spread reforestation would be directed to several ends.

"The development of community forests in New York State is already under way, and much interest has been shown in the planting of forests on lands owned by municipalities, townships, counties, and school districts. For example, lands which the counties have acquired through the non-payment of taxes, lands which are owned or have been given to cities or villages, lands owned by municipalities, such as water works, and state land acquired through non-payment of taxes and foreclosure of loan commission mortgages, can very readily be made productive by forest planting. In many isolated cases, such lands have already been reforested with trees from the state nurseries, and it should now be one of the important activities of the district forester to make this wide-spread and effective on a broad state basis.

"Highway planting is important, and has for years been recommended by the State Department of Highways. Appropriate trees should be planted along state roads, not only for the purpose of increasing their scenic beauty, but also for conserving a proper amount of moisture by shading the roads, thus preventing the deterioration of the highways. The forester in each district could prepare the necessary plans, supervise the work of planting the trees, and see that after planting they are properly protected, this work, of course, being done in co-operation with the State Department of Highways.

"Increased interest is being taken in the care of existing shade trees, and in the increase of shade trees for the future. The district foresters could give a certain amount of advice to the communities in regard to this matter, and assist in the organization of shade tree associations, thus adding materially to the welfare of the state.

"4. *Scientific Cutting.*—The average owner of timber land, and particularly the owner of the farm woodlot, does not fully understand the proper method of cutting, thinning, or selection of trees to be taken or left upon the land, in order that the greatest net return may be had from the land throughout successive years and generations. It is accordingly of the utmost importance that there be established a proper silvicultural treatment of woodlands. The private owners should be shown how to differentiate between useful and weed species, thereby bringing their lands to a far higher state of productivity of useful kinds of wood. The farm woodlot can be

greatly improved by proper cutting, while at the same time a profit is realized.

"5. *Marketing.*—The marketing of various forest products is at present not working to the advantage of the people of the state. Logs are sawed at mills without a full conception of the needs of the market, and the products of valuable forest trees are thereby materially reduced in value. The collection of information throughout the state as to the demands of the market and the distribution of this information among the producers of timber would jointly benefit the producer of the timber, the manufacturer, and the ultimate consumer.

"6. *Forest Recreation.*—Within the last few years it has come to be realized more clearly than ever before that one of the most important uses of great forest areas is their recreational use. In fact, so important has this use become in the Forest Preserve counties that the business of caring for vacationists far exceeds even the lumber business itself, in the capital invested in it, in the wages paid, and in the annual turnover. Demands for maps and guide books have been insistent, and never before have the people manifested such a deep interest in the recreational facilities of the forests. Each year large numbers of permits are issued for camps upon state land, while the number who camp for short periods without permits is far greater. This interest in healthful out-of-door recreation has become a national characteristic, and is being met by the Federal government in all of the great national parks by the creation of a special department for attention to the needs of vacationists. The administration of the state-owned Forest Preserve for vacationists is now an important function of the Conservation Commission. In addition, the Commission has jurisdiction over the Cuba Reservation in Allegany County, which, by the leasing of its cottage sites, pays an annual net revenue. While the district foresters in the Forest Preserve counties would necessarily give more attention to the recreational development of their territories than the foresters in other counties where state land is not located, it is nevertheless true that the foresters in every district could do much to stimulate proper development of forest recreation throughout the state, and distribute information regarding the recreation advantages of the Forest Preserve.

"Free Trees for Reforestation.—In addition to the administrative measures outlined above, I believe that the state should supply trees for reforestation free of charge to private land owners, under agreements with the land owners that the trees will be properly planted and cared for.

"Constructive Forest Taxation.—I believe also that our forest taxation laws should be revised so that the private land owner may be encouraged to permit his forest crop to grow to maturity.

"A full summary of the benefits that will accrue to New York State upon the adoption of a broad plan for forest development will reach into practically every phase of the life of the people. Hardly an industry can be named, which is not in one way or another dependent upon supplies of wood. With the development of our water resources, the need for wood supplies will be even greater. A decrease in the production of wood products and a relocation of mills elsewhere will all tend to increase the cost of products to the consumer. We must accordingly maintain and develop our forests, and thus protect our industries, and employ our labor. We must insure permanency in industry, and not allow parts of the Empire State to become deserted villages. This is a social and economic problem, which a broad plan of forest development can do much to solve."

LANDOWNERS' ASSOCIATIONS FAVOR FORESTRY

THE following account has been only recently received by AMERICAN FORESTRY of an important meeting held in New Orleans on September 4:

Managers of landowners' associations in a number of Southern States held an important meeting in New Orleans, recently. Those in attendance were: George R. Wheeler, manager, South Carolina Landowners' Association, Charleston, South Carolina; W. A. McGirt, vice-president and general manager, North Carolina Landowners' Association, Wilmington, North Carolina; F. H. Abbott, secretary, Georgia Landowners' Association, Waycross, Georgia; Dr. W. F. Blackman, manager, Florida Cattle Tick Eradication Committee, Jacksonville, Florida; C. S. Ucker, executive vice-president, Southern Settlement and Development Organization, Baltimore, Md., and A. G. T. Moore, director, Cut-Over Land Utilization Department, Southern Pine Association, New Orleans. Mr. H. E. Blakeslee, chairman of the organization committee, Mississippi Landowners' Association, Gulfport, Mississippi, was also present, and his organization has since then, come formally into existence. All of these organizations are directing their efforts toward the development of the resources of the South, as a means toward the improvement of the value of the lands owned by their respective organizations. Their activities take the form of substantial backing of the movements for good roads, tick eradication, improvement of rural conditions, etc. Upon request of Mr. Ucker, State Forester R. D. Forbes, of the Louisiana Department of Conservation, laid before the meeting the forestry work which is being done by Louisiana. Mr. Ucker's attitude toward forestry and fire protection had been previously stated in correspondence with Mr. Forbes as follows:

"Personally, I have long since reached this conclusion, that the home of the long-leaf yellow pine and the slash pine, of the naval stores, turpentine and resin, that is the South Atlantic and Gulf Coastal Plain area from south side Virginia to the Gulf coast of Texas, would reforest itself in a very few years, naturally, if it were not for the continued fires, and on the contrary, if we can protect all of that area by co-ordinated Federal and State effort from fires for a period of five or ten years,

we will have an unbroken forest. Then I think land classification will largely take care of itself. As the population expands, as the new settler requires additional areas, he will segregate the best soil, clear it off, and put it to use, and in the meantime all the balance of it will be growing timber, which will be getting, as years pass by, more and more valuable."

Mr. Forbes was kept busy answering questions concerning the Louisiana situation and the feasibility of applying Louisiana's methods in others of the Southern States. The meeting finally unanimously passed the following motion:

"That the basis of successful reforestation is fire protection and that it shall be the purpose of the various organizations here represented to individually and collectively exert all possible efforts within their respective states and territories to the end that the custom of "burning-over" the land be stopped or minimized to the greatest possible extent and to further place practical reforestation prominently in their respective programs of future activities."

". . . That in our opinion the work of reforestation as conducted in Louisiana should be emulated in other Southern States and to the end that this shall be done will our efforts be directed."

"That it is the consensus of our opinion that cattle raising and reforestation should go hand in hand with any National forest policy which may be evolved."

The work being done by the Federal Government in co-operative fire protection under the Weeks Law was explained to the meeting and the effort to obtain an increase in the Weeks Law appropriation for fire protection from $100,000 annually to $500,000, received hearty endorsement.

FOR FOREST INVESTIGATIONS

OUR forest resources are being depleted from two to three times as fast as our forests are growing. The supply in our eastern section is rapidly approaching exhaustion; the forest supply in the South will be exhausted within twelve or fifteen years; much of the timber in the Lake States is gone, and that on the Pacific Coast is being steadily cut.

Measures for reproduction, for fire protection, and for other features of a national forest policy, to provide forests for the future, are absolutely essential at this time.

It is necessary, for the successful operation of a national forest policy, to have a series of forest investigations in order to develop the best method of reproducing, growing, and protecting timber on denuded lands, for cutting and protecting timber on timberlands, and for investigating other forest problems.

It is necessary, in order to conduct such forest investigations, to have forest experiment stations located in various sections of the country and also to provide existing stations with more funds. Members of the Association are, therefore, asked to write to their Senators and Representatives in Congress and urge them to favor an increase in that section of the appropriation for the United States Forest Service, under the Department of Agriculture, which provides for general expenses as follows:

"For silvicultural, dendrological, and other experiments and investigations independently or in co-operation with other branches of the Federal Government, with states and with individuals, to determine the best methods for the conservative management of forests and forest lands, $78,728."

Urge that this appropriation be increased to $250,000, which amount will provide for such forest investigation as may be necessary.

CAN SAVE WHITE PINE

THAT the white pine, most valuable of American softwoods, can be saved, and not made extinct by the dreaded blister rust was the consensus of opinion at the international blister rust conference in Albany, when experts from all parts of the country gathered to discuss means of stopping the spread of the infection. If proper care is taken to prevent its spread there is no reason why the reforestation of this country with white pine can not be continued. Methods of treatment of the infected tree, but particularly of stopping the carrying of the spores to uninfected trees were discussed. Dr. L. H. Pennington, head of the Forest Pathology Department of the New York State College of Forestry at Syracuse, told of important tests in the Essex County region, to determine the distance to which the disease could be carried, and he gave his opinion that the blister rust spores were able to carry the infection to a much lesser distance than has commonly been supposed, thus making the protection of uninfected stands of pine much simpler. He urged that the greatest care be taken, however, to completely eradicate the currant and gooseberry bushes which participate in transmitting the pest within the danger zones. Prof. John W. Stephen, head of the Silviculture Department of the New York College of Forestry, told of practical investigations in Wisconsin. Clifford L. Pettis, chief forester of the New York Conservation Commission, presided at the conference.

LASTING QUALITIES OF CEDAR

AN ancient grave marker dug up near Seattle by workmen clearing land, disclosed a remarkable testimonial to the long life, durability and resistance to decay possessed by Washington red cedar.

The lettering on the marker, which remains distinct, showed that it must have been placed in commission nearly fifty years ago. There is no name on it to indicate over whose grave it was erected, but the date of death is inscribed as Dec. 30, 1868.

When unearthed the cedar piece was several feet under ground, indicating that it had lain there for many years. Although conditions were most favorable for decay, the marker remained in an almost perfect state of preservation. While it was weathered to a deep gray color, fungi and insects had given it a wide berth.

The Southern Pine Association

maintains a department of Cut-Over Land Utilization, which, with the U. S. Department of Agriculture and other agencies, is seeking to determine the best uses which can be made of the cut-over lands in the Southern States. The logical division for the utilization of these many millions of idle acres are—

1st—AGRICULTURAL DEVELOPMENT

2nd—LIVE-STOCK RAISING

3rd—REFORESTATION

An informative and reliable book describing in full the opportunities afforded on the cut-over pine lands of the South has been published, and is distributed free to all requesting it.

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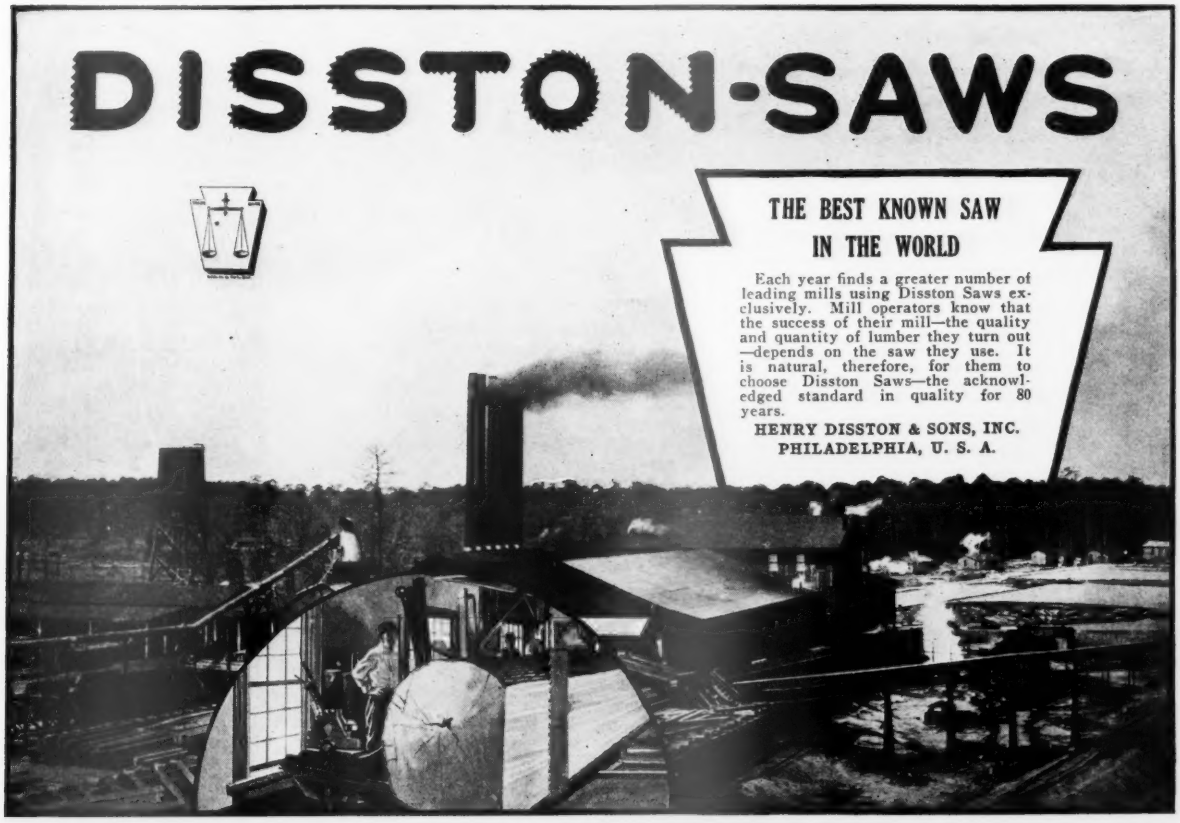
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Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree.

LANHAM, MD.

By Mrs. Charles Howser; Ensign Joseph F. Bellak.

FLORENCE, ALA.

By Woman's World War Memorial Association; Jesse Adams, John T. Barkley, William Calvin Brewer, Willia M. Creasy, Percy Crunk, T. A. Howell, John Wesley Hall, Herbert Lee Hill, Henry Holland, Jacob Heupel, Price Hill, Luther Hine, Private Lovelace, Elmer McFall, George Edwin McFall, Alonzo Nugent, William E. Param, Henry Smith, Thomas Clayton Underwood. Clyde Wilcoxsen, James E. Wesson, Frank Lester Young, Zacharia Agnew, Private Hardin, Beatrice Martin, Green Thompson.

AUGUSTA, GA.

By Woman's Club; Captain Louis Legarde Battey, William P. Battle, Jr., Jack Carr Byrd, Claude A. Barker, Corp. Barney Bivens, William J. Cooney, James W. Crowe, Lieut. Thomas Cumming, Thomas Edward Cockrel, John Allen Davis, Foster Davenport, A. S. Edwards, Clarence Epps, Lieut. L. B. Evans, Aaron Franklin, Ernest G. Gay, Eulie T. Goolby, Harry Green, O. M. Horne, Corp. O. R. Hardeman, James B. Hester, Forest H. Harrison, Sgt. John W. Hogan, Sgt. Willie E. Jones, Corp. Sheppard Jordon, Josh Keener, Anthony P. Knuck, Andrew Kep, William Edward Kent, Archie McCorkle, Jasper H. Morris, Sgt. T. A. Murphey, I. M. Moore, Daniel D. Morris, Willie Phillips, Frampton Page, John Neeley Page, George T. Pittman, Burr Wise Powell, Norman C. Pflager, Willie Ready, Ashley Rushing, John Henry Reese, Samuel Smith, Thurman Lee Swancy, Owen Alderman Sims, Fred E. Turner, Cadet Moultrie Clyde Trowbridge, Marvin G. Wright, Harry V Wells, Carl Williams, Mack Walthour, Lieut. Lee Walton Verdery, Willie Caldwell, Frank Monroe, Willie Hickson, Dan Gibson, Ernest Key, David Thomas, Johnny Walker, Otis Jones, Henry Garrett, Tom Reese, Ben Cumming, Willis Harris, Willie Ramsey.

THOMPSON, GA.

By Women's Club; Henry Earl Williams, Joseph B. Wilson, A. K. Forney, Holly Harrison, Fred Lee Isdell, Daniel J. Brown.

CARBONDALE, ILL.

By Civics and Suffrage Club; Curtis Allison, Arthur R. Carter, Wm. A. Watson, Ambrose Boulden, Donald Forsythe, John Arthur Wiley.

INDIANAPOLIS, IND.

By Arsenal Technical High School; John Agger, Seth Aldrich, Tom Alverson, Frank Anderson, Clarence Anderson, George Arnold, John Arnold, William Ash, Ralph Arbough, Herbert Bader, Fred Bakemeyer, Maxwell Baker, Norman Bailiff, Harold Bartholomew, Harold Barton, Howard Bates, Gerald Batman, Wesley Becker, Glen Bertels, Cecil Bevis, Arthur Black, Harold Bossingham, Paul Boswell, Harold Bradbury, Charles Brant,, Jr., Robert Brewington, Arch Brown, Hale Brown, Harry Brown, Walter Brydon, Franklin Burns, Paul Burns, Henry Butler, Noble Butler, Charles Cain, Ted Campbell, Paul Chevalier, Edward Churchman, Eugene Clarke, Leo Clifton, Clarence Conley, Pembroke Cornelius, Fred Coverston, Frank Cox, Blanton Coxen, Dallas Crooke, Oris Cunningham, Sydney Dailey, Francis Dallow, Albert Daugherty, Todd Davis, Alva Davidson, Will DeLaney, George Baker DeVan, Oscar Dickinson, Edward Doyle, Russell Durler, Donald Durman, Herbert Dux, Frederic Dyer, Donald Dynes, William Elder, Otis Elliot, Robert Endsley, Everett Ent, Lucy Erwin, William Ervin, Howard Everson, Winters Fehr, Fred Finehout, Paul Finney, Hugo Fischer, Jr., George Fritsche, Trevor Gaddis, Herbert Galloway, Dwight Good, Albert Greenwald, Fred Griggs, Ralph Gullet, Newell Hall, Robert Hamlin, William Hanley, Robert Harris, Thomas Harrison, Virgil Havens, Jack Haymaker, Paul Hemphill, Wilbur Hessong, Arthur Hewitt, William Hinkle, Leslie Hittle, Paul Hodges, Frank Hoke, Lehman Holliday, Roy Hosea, Elmer Huber, Everitt Hughes, George Hurley, Wilbur Ingleman, Leo Irish, Paul James, Kenneth Jeffries, Joshua Johnson, Phillip Johnston, Virgil Jones, Marshall Kimmich, Russell Kirschman, William Kiser, Robert Kline, Russell Koehler, William Kothe, Paul Koehring, Frank LaBarbara, Clarence Lang, Merle Lang, Leroy Langdon, Joseph Langton, Bernard Lawson, Russell Lindeman, Maurice Lindley, Emerson Loomis, Abram Lorber, Bernard Lorber, Harry Lot, Robert Lowes, Harold McCoy, J. F. McConnell, Harold McCord, Will McCullough, Fred McDonald, Albert McIllvaine, Wayne McMeans, Gerald McShane, Benito Macasset, Ray Magruder, Arthur Marquette, Edwin Marshall, Stewart Maxwell, Houston Meyer, Jonas Miles, Grester Miller, Joe Mix, Paul Moffett, Carl Moore, Earl Moore, Myron Moore, Guy Monihan, Ralph Moser, Jerome Murphy, Robert Myers, Frederick Nessler, Edward Newitt, Charles Newman, Forrest Nutt, Edward O'Conner, George Olive, Paul Ostheimer, Ivan Overman, Burl Owen, Edward Owen, Earl Pangborn, Oscar Parmer, Earl Perkins, Earnest Pickard, Samuel Pickard, Ralph Pike, Raymond Ping, Walter Portteus, Victor Prange, Paul Quill, Paul Ray, Fred Reif, Lewis Reynolds, Charles M. Richart, Oscar Ries, Paul Risk, Harold Robinson, Denton Rowley, Thalia Rush, Vincent Rush, Wilbur Rusie, J. C. Sampson, Leo T. Samuels, Clyde Sandford, Ralph Schaad, Arnold Schnepel, Norman Schoen, Ray Schoen, Francis Schoppenhorst, James Patrick Scott, Richard Sherman, Ralph Shimer, Thomas Shimer, Joseph Sims, Paul Singleton, Alfred Sloane, George Smith, Merrill Smith, John Spotts, Arthur Stewart, Gordon Stewart, Connie Stumpf, Frank Sullivan, Harry Swanson, Paul Trees, Wiliam Treisgan, Jack Thurston, Harry Tomlinson, Alva Maurice Tuttle, Claude Vane, Gordon Varney, Robert Vehling, Walter Vinson, John Voris, Earl Wagner, Mentlow Ward, Rollo Warren, John Watkins, Glen Webb, Homer Webb, Leonard Webster, Charles Wheat, Elmer Wiebke, Kenneth Williams, Rush Williams, Earl Wise, Raymond Woods, Harry Woodsmall, Allen Wortman, Charles Young, George Young, Lowell Young.

GREENDALE, KY.

By Kentucky Houses of Reform; Gen. John J. Pershing, Marshall Underwood Corum, Gen. Foch, Sgt. Alvin York, Miss Georgia Watts, Miss Curry Breckenridge, Woodrow Wilson, J. C. W. Rockhans, Sr., A. O. Stanley, Jr., Ollie James, Governor James Black, Charles P. Weaver, Frank A. Johnson, E. H. Doak, John W. Milliken, F. T. Forman, Dr. W. P. Roberts, Rev. Dick Redd, Miss Annie G. Marquis, Bernard Gratz Moton, Mrs. Mary Gratz Moton, Mrs Martha Gilchrist.

LAGRANGE, KY.

Graded and Oldham High School; Everett F. Smith, Bryan Duncan, Zolhary H. Button, Bryan Taylor, Wiliam M. Smith, Harry Ratts, William Purnis, William Henry Clare, Norman Neal, Andrew Hill, Edward Ross.

LOUISVILLE, KY.

George Rogers Clark School; Pierce Butler Atwood, Howard Dohrmann, Edward Garrett, James Marshall.

NEW ORLEANS, LA.

By Audubon Park Commission; Captain Charles DeV. Allain, Harold J. Alexander, Capt. George W. Anderson, Sgt. Charles L. Baudry, Maxwell Block, Philip S. Bowling, Donald Bradburn, A. Oscar Brown, Capt. A. C. Callender, Leon Clausner, Lieut. G. P. Cole, A. L. Croneberg, Bernard J. Daly, Wm. C. Devitt, A. A. Diettel, A. B. Hoheny, P. A. Oubre, Sgt. John A. Perelli, Lieut. T. J. Powell, James Price, Corp. C. L. Putnam, H. J. Remondet, Corp. L. R. Rollins, Wm. A. Roper, J. Sanchez, R. J. Schaefer, W. J. Schutzmann, J. A. Stanton, M. J. Stiller, T. J. Sturges, M. C. Suarez, R. J. Titus, A. B. Vautrain, L. C. Watermeier, D. W. Wiedman, Sgt. A. F. Williams, J. C. Zittmann, Lieut. David J. Ewing, Corp. John J. Farrelly, George Gassenberger, Corp. Thomas A. Gragard, R. L. Guilbeau, John A. Hanmer, E. J. Harrison, Hy. J. Haydel, Corp. S. Hellman, Alex. Hoffman, Prentiss M. Johnson, John J. Kelley, Arthur Kennedy, Joseph R. Larm, P. J. Manning, G. C. Mattin, F. J. Miguez, Sgt. E. F. Miler, H. D. Moore, J. F. Newitt, Lieut. Robert W. Nolte.

WALTHAM, MASS.

First Parish Sunday School; Charles Bacon.

CARUTHERSVILLE, MO.

By Woman's Club; Jesse Allison, William R. Barley, Harvey Bush, Carroll Depriest, Jiles E. Dunn, James Gowen, Slaughter Hart, John Heath, Clyde E. Holmes, Auvel L. Lean, Joseph J. Lee, Ray N. McHarry, Robert A. Malone, Thomas C. Metcalf, Alva Levi Mead, James R. Monan, Pierre S. Phillips, Jerry Ruby, Robert Shade, Walter Southern, Roy C. Spicer, Alfred Tate, Jake P. Turnbow, Fred A. Walker, James E. Wheeler, Oliver Lawrence, Clay Hudgings, Fred Reid, Arlie Ray Duckworth, George L. Goff, Verland Burch, Curtis Disbennet, —— Flowers, —— Sims, Eddie Grimes, Laurie Mack.

CAMP DIX, N. J.

By Woman's Musical and Literary Study Club; Miss Lillian A. Clemens.

BROOKLYN, N. Y.

By St. Charles Borromeo Church; Captain John J. Tuohy, Sgt. James F. Travers, Thomas Crann, Robert Luff, Henry P. McCann, Edward McGuinness, Francis P. McKeon, Denis F. Sullivan, John F. Sullivan, Harold J. Turrell, James M. Wheeler.

MAMARONECK, N. Y.

By Mothers Club; Lieut. Col. Sherman Avery White.

MOHEGAN LAKE, N. Y.

By Van Cortlandt Chapter, Daughters of the American Revolution; Raymond Moore, Jr.

NEW YORK CITY.

By Church of Our Lady of Perpetual Help; Charles R. Ash, Thomas F. Baker, Frank Bates, Francis I. Corcoran, Charles G. Ostberg, Jeremiah P. Roach, Joseph G. Roberts, Raymond A. Tighe, William J. Tighe, George Von Lubken, Richard J. Whelan, Thomas P. Waring, William J. Ryan, George J. McDonough, Junior Members, Catholic Women's Civic League, Senior Members, Catholic Women's Civic League, Howard P. Crygier, Francis A. Donaghy, Jeremiah J. Dalton, Howard M. Driscoll, George Dow Gibson, Eugene Edward Gotimer, Francis A. Hamlett Daniel A. Hart, Wiliam Reginald Kelley, James B. Kennedy, Louis J. Lazzaro, James B. O'Donnell.

TARRYTOWN, N. Y.

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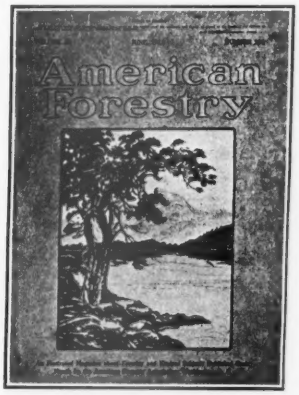

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*This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

PROF. BROWN IN EUROPE

PROF. Nelson Cortlandt Brown, of the faculty of the New York State College of Forestry, at Syracuse, has gone to Europe for special consultation on forestry problems with the new Czecho-Slovak republic, chiefly regarding the disposition or management of the Hapsburg crown lands, which reverted to the new republic when the ancient Austro-Hungarian monarchy fell.

TENNANT LEAVES HOO-HOO

ANNOUNCEMENT has been made of the resignation of E. D. Tennant as Secretary-Treasurer of the Order of Hoo-Hoo, in order to take up his new duties in connection with his recent appointment as vice-president of the Commercial Journal Company, publishers of *Lumber*. Mr. Tennant is followed as secretary of Hoo-Hoo by H. R. Isherwood, Retail Service Representative of the National Lumber Manufacturers' Association, and well and widely known throughout the industry.

OFFICES OF MARYLAND STATE BOARD OF FORESTRY DESTROYED BY FIRE

The offices of the Maryland State Board of Forestry in McCoy Hall, Johns Hopkins University, Baltimore, were destroyed by fire on November 27. With the exception of some publications and exhibit material, which was kept in another building, everything was destroyed, including valuable records representing several years of field study and investigation, a report in manuscript form, 700 lantern slides, some 1500 photographic negatives, about 3000 photographs, a forest library of some 200 volumes, together with a nearly complete set of state publications on Forestry, and publications of the Federal Forest Service.

One of the most serious losses was that of the files containing the mailing lists and official records, which cover a period of htirteen years of State Forestry work. In some respects it is necessary to begin the work over again, although the published reports contain a record of fair accomplishment.

Since the mailing list will have to be entirely remade, it is important that those who wish to secure future publications of the Maryland State Board of Forestry should make application to be entered on the new mailing list

ILLINOIS BARS ALL EASTERN CHRISTMAS TREES

ILLINOIS did not receive any Christmas trees from the New England States this year as importation of New England Christmas trees into Illinois was forbidden by proclamation of Governor Lowden. This prohibition was announced as an effort to prevent the ravages of the Gypsy moth among the evergreens of Illinois. The moth infests Christmas trees in Maine, New Hampshire, Connecticut, Massachusetts, Rhode Island and Vermont and is doing much damage.

Three other proclamations were issued by Governor Lowden, one forbidding importation of chestnut trees from certain states in the east; another forbidding importation of barberry bushes, and the third forbidding importation of pine trees from states in the east.

THUNDER MOUNTAIN NOW IN NATIONAL FORESTS

CONGRESS has set apart 1,116,000 acres of land in Idaho known as the Thunder Mountain region as national forest lands. This great tract, difficult of access and having not over 1 per cent of its area suitable for agriculture, has for years been the scene of destructive fires and devastation due to overgazing. It is now to be added to the Payette National Forest, which adjoins it on the south and west, and the Idaho National Forest, which adjoins it on the north and west.

BOUQUETS

"I am much interested in your announcement of a Foresters Edition. I shall undoubtedly want both editions. I shall surely want the technical forestry articles and should be very sorry to miss the interesting articles on birds, etc."

GORDON PARKER,
Colorado College of Forestry.

"I am interested in your articles along the line of shade tree work which you designate as one of the popular lines of forestry and which appear in the main issue of AMERICAN FORESTRY. At the same time I am interested in all branches of technical forestry and lumbering and one reason for taking AMERICAN FORESTRY is to keep in touch with these lines of work. How much are both editions?"

PHILIP E. ALDEN,
Shade Tree Commission, Kearny, N. J.

"That is a good notion to introduce more technical or semi-technical material into AMERICAN FORESTRY, and I wish to be registered for the Foresters Edition."

B. E. FERNOW.

"I was very much interested in your November number of the Foresters Edition of AMERICAN FORESTRY. I think that it will suit foresters and those who are financially interested in timberlands better than the more popular edition."

J. S. HOLMES,.
State Forester of North Carolina.

FOREST FIRE LOSSES.

FOREST fires are costing the West five or six million dollars every bad year, says a recent issue of The Forest Patrolman, published by the Western Forestry and Conservation Association at Portland. Much of this loss is preventable. This association asserts that the wise expenditure of one per cent of this five million dollars could secure such public interest and so encourage fire preventative measures that forest fire causes could be reduced practically to lightning and incendiaries. Forest fire losses the past season were heavy in Montana and parts of Idaho, light in Washington and above normal in Oregon. California had severe fires late in the season so that complete data is not yet in with reference to her total losses. The expenses for protection of privately owned lands will be above the average for the season, due in part to the high cost of labor and supplies. The effort of private timberland owners to reduce fire loss is efficiently organized and has been generally effective. As a result of greater activity in law enforcement, many more convictions were secured this year under the fire laws than heretofore.

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CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

AT a meeting of the Quebec Forest Protective Association held in the Office of the Minister of Lands and Forests in Quebec, the question of clearing railroad rights-of-way was discussed at length. The Dominion Railway Commission requires that all rights-of-way of railroads under their jurisdiction shall be cleaned and kept clean, but on the Government operated roads this rule has not been enforced. It was recommended that the Dominion Department of Railways and Canals be asked to carry out this procedure which would help materially to lessen the fire risk. There has also been a move on the part of the Government to require holders of leased lands to clear a strip of land 100 feet back from a railroad right-of-way of logging debris, but the question comes up as to whether settlers along the rights-of-way should not also be compelled to clear a like strip, as often as they own lands adjoining and interspersed with those under license, and to clear one without clearing the other would be of no use. Railroad fires during the past season were very frequent. The question was also discussed of asking for legislation to compel everyone entering the forest to have either the badge of the licensee or a permit from a fire ranger so that those going into the woods would have sense of responsibility and also that the fire rangers could keep track of those travelling in their territory. The permits would cost nothing, and there is already a permit for such action in the Provincial Parks. The burning of all debris in the making of log roads, tote roads and colonization roads was also recommended, and also the fixing of minimum terms of imprisonment for infractions of certain of the fire laws. At present the maximum and minimum fines are set, and also the maximum terms in prison, but there is no minimum and the justices sometimes let a man off with an hour's or a day's imprisonment, thus making a travesty of justice.

At a meeting of the Forestry Advisory Committee it was recommended that the extra length allowed on logs for which no stumpage would be charged, in order to cover brooming of logs in rapids and rocky streams should be, for wood cut four feet to seven in length, two inches, from eight to eleven feet, four inches and twelve feet and up, six inches. Reforestation was also discussed and an important announcement by Mr. Piche, Chief Forester, of what he proposed to recommend to the Government, was made.

An interesting report of the Commission of Conservation on butt-rot in balsam will shortly be forthcoming. The commission, in co-operation with the Department of Entomology will build a laboratory at the field experiment station of the Laurentide Company, at Lake Edward.

Price Brothers and Company have engaged Lieutenant Vezine as a pilot and are sending him to England to buy two of the latest type flying boats for use in mapping and exploring their limits next summer. This is the third paper company to undertake the use of aircraft in forestry work.

Mr. Jean J. Guay, Assistant Forester of the Spanish River Pulp and Paper Company, is on six months leave of absence and is exploring timber lands in Newfoundland.

Messrs. Arnold Hanssen and G. A. Faulkner, will open an office in Montreal the first of the year, and will undertake timberland reports, cruises and surveys and other forestry work. Mr. Hanssen is a graduate of the University of Norway, the Kongsburg Forestry School in Norway, the Yale Forest School, and has been with the Laurentide Company since 1912. He served with credit in a hospital unit in France during the war. Mr. Faulkner is a graduate of the University of Maine, and has been some months with the Laurentide Company.

The experimental cutting of the Commission of Conservation in co-operation with the logging and forestry divisions of the Laurentide Company is progressing favorably. 9458 13½ foot logs, and 114 cords of nine foot logs have been cut to date and the slash burnt. Growth and volume studies are being carried out on the trees felled. The Quebec Government has been asked to set the operating area of this experiment aside as a forest reserve so that the results of the work can be studied continuously.

The new Farmer's Party in Ontario have taken over the reins of Government, and have put a plank in their platform for conservation and use of their forest resources. It is hoped that they will take this matter to heart and really give Ontario a good forestry policy. The Canadian Forestry Association has, for a long time, advocated the placing of all the Province timberland under the Forestry Branch, instead of having, as at present a separate non-technical branch to handle the work. Fire protection also needs to be made more efficient by the entire elimination of the patronage evil.

Messrs. Leavitt, Craig and Wilson attended the meeting in Syracuse where Colonel Graves spoke on his revised forest policy. After the meeting Ellwood Wilson and Lieutenant Graham, in charge of the aviation work of the St. Maurice Forest Protective Association, went to Rochester to discuss the subject of aerial photography with the Folmer and Schwing Division of the Eastman Kodak Company and their experts. The Eastman Company have done remarkable work in building aerial cameras, and in simplifying their operation, and they are now paying special attention to forestry work. With their assistance it is hoped to perfect the photographic end of this important work. A special study is being made of the interpretation of forest photographs and some progress is being made. It is too early yet to say just what can be read from these pictures about the stands of timber. Maps already made from them check up very accurately with ground work and give infinitely more detail and better ideas about a country. Burns are clearly defined, reproduction on burns shows plainly, lakes, Creeks, swamps and rivers show up well, portages and log roads where not too much overhung with trees are quite plain, and even when overhung can often be traced on the map. It is easy to distinguish between some species of hardwoods. The line of study at present being followed is the intensive study on the ground of lands which have been photographed. "Close ups" will be taken at low altitudes of areas which appear typical on the prints and panchromatic films with filters in order to get better color values.

In Canada, as in the United States, the problem of forest reconnaissance in order to determine the amount and location of available timber supplies is becoming more and more urgent. The Province of Nova Scotia was the first to take up the matter and under Dr. Fernow the work was completed. The Commission of Conservation, in co-operation with the Province of British Columbia, has made a rough reconnaissance and estimate for that Province, and has commenced the work in Ontario. New Brunswick has made great progress in mapping and estimating its Crown Timberlands, Much work has been done in Quebec by the Government and by private companies, but all over the Dominion much remains to be done in order to have a sufficiently accurate inventory for practical purposes. The position which Canada has taken in the newsprint industry makes it imperative to know how long our present supplies will last and what is coming on for the future. Aerial photography offers the best and most rapid, as well as the cheapest means of doing this work over the huge areas which have never been mapped or on others only partially mapped. In co-operation with the Department of Naval Affairs, and the Quebec Department of Lands and Forests, the Laurentide Company will attempt to map photographically 5,000 square miles of timber lands belonging to the Province of Quebec during the coming summer.

STATE NEWS

INDIANA

DESPITE the inroads which have been made on the timber in Ohio, Indiana, Illinois, each of these three states still has a large area—about 3,000,000 acres each—in farm woodlands, according to United States Forest Service figures. This represents between 10 and 15 per cent of the total farm area. Lumber production in these states has declined greatly in the last twenty years. In 1899 Indiana and Ohio each produced about a billion board feet of lumber; in 1918 each produced one-fourth of a billion board feet. In 1899 Illinois produced 375,000,000 board feet; in 1918 the output had declined to 50,000,000 board feet.

NEW YORK

FACED by the fact that New York State is cutting from three to five times more timber than is grown there each year, and that the vital manufacturing establishments which depend upon unfailing supplies of forest products are migrating to other fields, the Conservation Commission has just made public a rational forest policy for the State, the adoption of which is urged in order to offset the imminent menace of a wood shortage. The policy, which is contained in a letter mailed by Conservation Commissioner George D. Pratt to the Governor and members of the Legislature for their consideration between now and the rush of the legislative session, constitutes a unified plan to meet the necessity for a proper protection and development of the forest lands of the State, as well as to replenish the fast waning supply. It is the first broad-guage response to the warning made by Colonel Henry S. Graves, Chief of the United States Forest Service, based upon a timber survey to meet war needs, that timber in the east is rapidly approaching an end, and that the remedy for the situation is one of the most fundamentally important questions with which we have to deal today.

The measures now suggested as a solution of the problem in New York State have, according to Commissioner Pratt, already in their main features been thoroughly developed and tested by the Conservation Commission in the two greatest forested regions of the State.

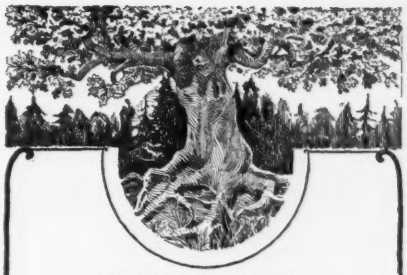
Among the first steps advocated is the division of the State into ten forestry districts, each under the supervision of an experienced forester. He would act under the direction of the Division of Lands and Forests of the Conservation Commission in the same way that district rangers in the Forest Preserve counties now administer their forest areas. In matters relating to forestry, such a man would occupy a place similar to that occupied in agriculture by the Farm Bureau agents, whose work has been so proved a success.

"A full summary of the benefits," the letter says in conclusion, "that will accrue to New York State upon the adoption of a broad plan for forest development will reach into practically every phase of life of the people. Hardly an industry can be named, which is not in one way or another dependent upon supplies of wood. With the development of our water resources, the need for wood supplies will be even greater. A decrease in the production of wood products and a relocation of mills elsewhere will all tend to increase the cost of products to the consumer. We must accordingly maintain and develop our forests, and thus protect our industries, and employ our labor. We must insure permanency in industry, and not allow parts of the Empire State to become deserted villages. This is a social and economic problem, which a broad plan of forest development can do much to solve. The next session of Congress will see bills introduced to stimulate this work throughout the entire country, and to co-operate with those states that take constructive action. By the initiation of the work here outlined, New York will benefit by the Federal co-operation under laws already passed, and will place herself in the vanguard of those commonwealths that realize the exhaustibility of forest resources and the necessity for conservation and replacement."

OREGON

THE request by the Air Patrol Committee, of the Western Forestry and Conservation Association that air patrol of forested areas be established for all Northwestern states the 1920 season is epochal in forest protection endeavor. For the past two months the committee of which C. S. Chapman, Forester for the Association, is chairman, and which is composed of representatives of Federal, State and private interests in all states from Montana to California, has been working with local air service officials in the planning of intensive patrol for the areas in question. The War Department has now been asked to furnish for the 1920 season 5 complete observation squadrons of 18 planes each, or 90 planes for this work, with the required number of pilots and observers.

It is planned to have planes equipped with wireless so that location of fires observed may be immediately sent to re-receiving stations which the Signal Corps



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PATRONIZE OUR ADVERTISERS

is requested to establish. Forest officers will be stationed at each base, sub-base and landing field to act with the air service and tie up the work so there will be no lost motion or lack of efficiency. The committee points out that the area to be patrolled embraces one-half the merchantable standing timber in the United States. It also embraces some 80 million acres of government owned timber and probably from the standpoint of value 80 per cent of all government owned timber outside Alaska. Protection agencies feel that air patrol gives promise of being one of the greatest factors in solving the fire problem. They likewise believe that the opportunity given to train pilots and observers while these officers are performing useful service in conserving government property should insure favorable action by the War Department in the establishment of the patrol as requested.

OHIO

"CATALPA trees should not be planted in northern Iowa," says G. B. McDonald, of the forestry department of Iowa State College, in response to many inquiries about the planting of this tree to secure material for fence posts.

Nine out of every ten catalpa groves in northern Iowa fail as do also the osage orange groves. The winters are too severe and these trees are easily killed. There are some successful catalpa groves in southern Iowa, but not many. Cottonwood grows quicker and does well on overflow and waste land. In five to seven years a good many fence posts can be secured from a cottonwood grove. These posts, however, must be treated with a suitable preservative. One-sixth of an acre of cottonwoods planted each year will furnish 200 good fence posts annually.

PENNSYLVANIA

HON. Robert. S. Conklin, Commissioner of Forestry, states that 150 bushels of Black Walnuts were planted this fall in the Mont Alto nursery in Franklin County. The seed was good in quality and should produce one hundred thousand seedlings which will be available for planting next year. Most of the trees will be distributed to private planters throughout the state, who are anxious to start groves of this valuable tree, the wood of which was in such great demand during the war.

of Forestry for planting anywhere within the state. The only charge which the applicants must satisfy is the cost of packing and shipping which is usually less than 50 cents per tnousand trees. From 500 to 2,500 trees should be planted per acre. Two men can plant one thousand trees per day.

Millions of thrifty and valuable chestnut trees have been killed in Pennsylvania during the past ten years by the chestnut blight, which was imported from China. It has done already an enormous amount of damage and unfortunately no satisfactory preventive measure of control is yet known. In many regions where this tree once prevailed only a few subnormal living specimens remain. Commissioner Conklin recommends the immediate disposal of all dead and dying chestnut trees, and the restocking of such areas by planting valuable forest trees.

The most promising development of the past year in the field of reforestation is the interest mining companies are taking in forest tree planting. Fourteen different companies already have committed themselves to the practice. During the past four years mining companies have planted over 450 thousand trees, of which number 250 thousand were set out during 1919.

Pennsylvania stands in front of all other states in the development of the state-owned forest land and in the degree to which it co-operates with private owners in the care and development of their forest land. The growth of forest tree planting by private owners of woodland has been phenomenal. The work was first undertaken in 1910, and its wonderful growth is shown in the following table of the number of trees planted each year: 1910, 66,374; 1911, 25,360; 1912, 66,854; 1913, 47,770; 1914, 108,685; 1915, 115,577; 1916, 1,471,875; 1917, 1,812,997; 1918, 2,186,899; 1919, 3,038,085.

Coal companies are beginning to see the value of reforestation. They are experiencing great difficulty in procuring suitable mine timber at a reasonable cost, and they realize that it is now possible to grow timber of usuable size on their own holdings, at present almost entirely unproductive, long before the supply of their mines will be exhausted. Commissioner Conklin predicts that mining companies will plant at least five hundred thousand trees during 1920, and announces that the Department of Forestry is co-operating with them by supplying the planting stock, and giving technical advice free of charge.

TEXAS

ON November 14 the Texas Forestry Association held its fifth annual meeting at the Chamber of Commerce in Dallas, and it was the most successful meeting the Association has had. For the benefit of Association members the proceedings of the meeting will be reviewed in the "Texas Forest News." Arrangements are being made to print the full proceedings of the meeting in circular form for distribution to Association members, legislators, and other interested Texas citizens.

Mr. Tom Finty, Jr., of the Dallas Evening Journal, gave the opening address. Mr. Finty expressed the belief that the people of Texas are being impressed more than perhaps we realize by the work of the Forestry Association. President Jones made his annual report, reviewing briefly the progress made since the last meeting, and expressing confidence in the future development of forestry work in Texas.

Following the papers there were three resolutions passed:

1. A resolution advocating the teaching of Forestry in the Schools of Texas.

2. A resolution approving Colonel Graves' plan providing for a national forest policy as a basis upon which to construct a suitable forest policy for Texas.

3. A resolution endorsing the work and plans of the State Forester, and pledging the support of the Association to the State Forester's policy.

VERMONT

THE practice of rational forest management on a large tract of timberland in Vermont has been initiated, not by the Federal or State government, but by Middlebury College on the Battell Forest, its 30,000 acre tract of forest land in the Green Mountains. The timber on this tract consists, for the most part, of a mixed stand of old growth spruce and hardwods—chiefly yellow birch, beech and maple—grading into pure spruce on the upper slopes.

In the first sale of timber that has been made under the management of E. I. Terry, the forest manager, the operator has agreed to dispose of the slash by lopping tops of both spruce and hardwood. In all future sales the trees to be cut will first be marked by the forest manager and the slash disposed of. Old and decadent trees, even though of little or no value for lumber, will be cut in order to make room for thrifty young growth, and all cut over areas will be promptly restocked with spruce, either by natural seeding or planting.

A forest survey, which will include the mapping and estimating of the entire forest, has just been completed.

"The best way to dispose of hardwood slash," says Mr. Terry, "is to work up the limberwood and all parts of the trunk unfit for saw-logs into cordwood, wherever a market renders such disposal possible. This is now the case on many parts of the Battell Forest. If there is no market for cordwood, the branches must be lopped so that they will lie close to the ground and soon decay. The best way to dispose of spruce slash is to pile the branches and burn the piles when the ground is covered with snow."

WASHINGTON

"1919 one of the most disastrous years in the point of forest losses the North Idaho Forestry Protective Association has ever experienced," announces W. D. Humiston, of Potlatch, Idaho. "The actual destruction of timber was not so great as 1910, but the area burned over was larger and the cost was greater this year. The worst years previous were 1910 and 1914, but the estimate is one and a half more than in 1910." An expenditure of approximately $116,000 for fire fighting was reported by the Pend Oreille Timber Protective Association for 1919, according to the statement of T. L. Greer, secretary-treasurer of the association, at the regular monthly meeting of the North Idaho Forestry Protective Association at Spokane.

The Potlatch Timber Protective Association reports a financial loss by fire of $22,153 during 1919. This includes 66 fires and covered an area of 1,211,150 acres.

The total number of fires in the territory of the Clearwater Timber Protective Association was 74, entailing a cost of $22,164 for fire fighting for the year. The season's total expenses were $46,603. The timber loss for the territory was 3,635,000 feet.

The total net receipts for the National Forests in Montana during the fiscal year ended June 30, 1919, were $380,171, according to figures announced from the forestry headquarters. Twenty per cent will be paid to the state for schools and roads in the counties in which the forests are situated. In addition, 10 per cent will be spent on road and trail construction within the forests themselves.

BOMBS IMPRACTICAL FOR FIGHTING FOREST FIRES

Ingenious, imaginative persons have recently proposed as a method of fighting forest fires that gas bombs be dropped from airplanes. Officials of the Forest Service say that this suggestion is entirely impractical. There is no analogy between the suggested method and the use of poison gas bombs in fighting, because a fire can not be "poisoned" but must be smothered. Although one part of a poison gas to one million parts of air might be sufficient to kill soldiers, yet 750,000 parts of inert gas to a million parts of air probably would not suffice to put out a fire.

The only kind of gas which will assist in stopping a fire, forest officials declare, is an inert gas that will neither burn nor support combustion, such as nitrogen or carbon dioxide.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

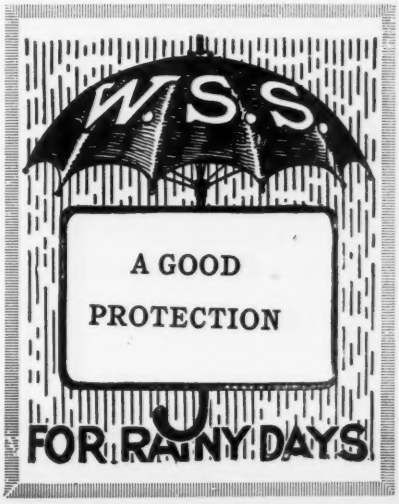
Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.



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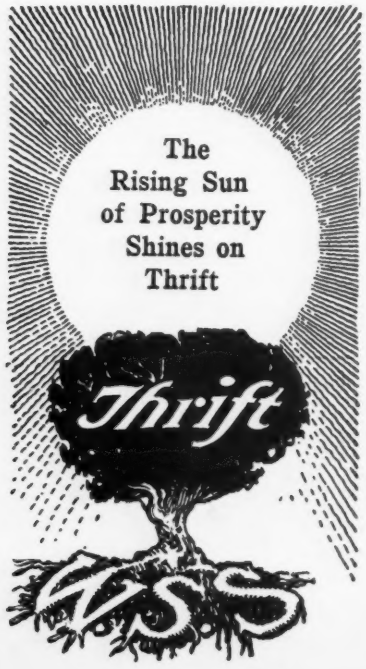

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

Carl A. Kupfer, of the United States Forest Service, recently gave the Forestry Club a very interesting account of the work of the Forest Products Laboratory at Madison during the war. Two exceedingly well arranged reels of moving pictures, showing different aspects of the work in timber testing, airplane glue research, dry kiln experiments and wood preservation tests were a feature of the evening's program.

At a meeting of the Forestry Club around the camp fire in Telegraph Canyon, Colonel W. B. Greeley, assistant forester, gave an interesting and inspiring talk on the progress of forestry in the United States.

After six months of deliberation, the Board of Regents has appointed Lieutenant-Colonel David P. Barrows to the presidency of the University. Colonel Barrows is essentially an out of door man who knows intimately and loves the mountains and forests of California. Forestry and conservation can be sure of constructive interest and support from the new president.

The end of the fall semester marked the close of an epoch in the life of the Forestry Division at California. With the opening of the new term on January 13, an entirely new arrangement of courses went into effect. This is made possible by a radical revision of the curriculum of the College of Agriculture, which allows more latitude in the selection of courses of interest to foresters.

Ansell F. Hall, '16, will assist Professor Mulford with the course in General Forestry. He was granted leave of absence by the National Park Service, until May 15. He is regularly stationed in Yosemite National Park.

The forest library has been enriched by the purchase of over one hundred volumes of French books on forestry. These include a nearly complete set of the "Revue des Eaux et Forets" and such standard texts as "Technologie Forestiere" by H. Nanquette, "L'Amenagement des Forets" by L. Tassy and "Traite de Sylviculture" by A. Jacquot. The acquiring of these books was made possible through the kind cooperation of Lieutenant Colonel Woolsey, who arranged for their purchase during his stay in France.

Among the books presented to the library by Hall, '16, and Ryerson, '16, are the rare two-volume folio edition of the "Statistique et Atlas des Forets de France" by Lucien Daubree and an exact pen and ink copy with English translation of the working plan document for the management of the forest of Gerardmer.

UNIVERSITY OF MONTANA

AN interesting feature of the Ranger School this winter will be a Rangers council or seminar in which studies will be made of the problems of the District Ranger.. Their problems will be presented and discussed by the rangers, and the meetings will be organized and entirely controlled by themselves, only such advice or expert help being brought in as is requested by the council.

An unusually strong organization of experts and professional workers in various lines of forestry, lumbering and grazing have been secured to assist the regular teaching force in the ranger school. Students will, during the twelve weeks of the school, come in contact with and receive instructions from some forty experts in the various branches of their work.

An unusually large number of applications for registration in the Ranger School have been received in advance of any published announcement of the short course for this year—prospects point to a large enrollment from the southwestern districts for the new short course in grazing.

Assistant Forester W. B. Greeley, of the Washington office of the Forest Service, recently addressed the Forest School in a very interesting lecture on various problems of a national policy in forestry.

Mr. Greeley emphasized the fact that a timber famine would come about long before our forests were exhausted in a scarcity of timber rather than a complete lack of timber. He said that this famine was even now felt in the east where the large wood using industries were finding their supply of timber at an increasingly farther distance. Many of them are being forced to close down, Mr. Greeley stated, because of the cost of bringing in wood material from a great distance, and many of them are abandoning costly plants in order to move nearer a new supply of wood.

He foresaw that the northwest would become important soon in the pulp and paper industry.

The assistant forester feels that too little interest is being shown in reforestation and the restoration of forest growth to lands valuable only for forest growth. Timber is being cut rapidly and often wastefully, and is not being replaced. Our accessible timber of sorts upon which wood using industries depend will soon be exhausted with nothing being done to replace it. The supply of southern pines is even now nearly gone. Figures are not available to show how nearly loss by fire and other devastation balance new forest growth.

"Get forest growth!" says Mr. Greeley, should be the watchword of every forester.